



Building
something
great

September 2025

Dunmore Lakes Sand Project Annual Review

1 July 2024 – 30 June 2025





Document Control				
Ref	Prepared by	Approved by	Date	Distribution
V1.0	Matt Bray	Lauren Sibigtroth	30/09/2024	• Department of Planning Housing and Infrastructure • Shellharbour Council • CCC members • Online at https://www.boral.com.au/locations/boral-dunmore-operations
V2.0	Ionut Ciobanu Oprea	Lauren Sibigtroth	30/09/2025	• Department of Planning Housing and Infrastructure • Shellharbour Council • CCC members • Online at https://www.boral.com.au/locations/boral-dunmore-operations



Name of operation	Boral Dunmore Lakes Sand Project
Name of operator	Boral Resources (NSW) Pty Ltd
Development consent	DA-195-8-2004
Name of holder of development consent	Boral Resources (NSW) Pty Ltd
Water licence number	WAL24477
Name of holder of water licence	Boral Resource (NSW) Pty Ltd
Name of holder of EPL	Boral Resources (NSW) Pty Ltd
Annual Review start date	1 July 2024
Annual Review end date	30 June 2025
I, Stuart McLean, certify that this audit is a true and accurate record of the compliance statues of the Dunmore Lakes Sand Project for the period of the 2025 Financial Year and that I am authorised to make this statement on behalf of Boral Resources (NSW) Pty Ltd. Note The annual review is an 'environmental audit' for the purposes of section 122B(2) of the Environmental Planning and Assessment Act 1979. Section 122E provides that a person must not include false or misleading information (or provide information for inclusion in) an audit report produced to the Minister in connection with an environmental audit if the person knows that the information is false or misleading in a material respect. The maximum penalty is, in the case of a corporation, \$1 million and for an individual \$250,000.	
Name of authorised reporting officer	Stuart McLean
Title of authorised reporting officer	Quarry Manager
Signature	
Date	30/09/2025

Contents

1. Purpose and Scope.....	10
1.1. Statement of Compliance	12
2. Site Operations	15
2.1. List of Relevant Approvals.....	17
2.2. Modifications Approved in the Last 12 Months	17
2.3. Operations last 12 months.....	18
2.4. Operations next 12 months	18
2.5. Production, Sales and Transport.....	18
2.6. Production Sales and Transport Next 12 Months.....	19
3. Actions to be completed from the Last Annual Review.....	19
4. Environmental Performance	21
4.1. Meteorological Monitoring.....	21
4.1.1. Meteorological Monitoring - Long Term Analysis and Trends.....	21
4.1.2. Meteorological Monitoring Summaries and Opportunities for Improvement.....	21
4.2. Air Quality Monitoring	21
4.2.1. Deposited Dust Assessment Criteria.....	22
4.2.2. Deposited Dust Monitoring Performance Review	23
4.2.3. Particulate Monitoring Assessment Criteria.....	27
4.2.4. Particulate Monitoring Performance Review	27
4.2.5. Air Quality Monitoring Long Term Analysis and Trends	28
4.2.6. Air Quality Monitoring Summary and Opportunities for Improvement.....	29
4.3. Noise Monitoring	30
4.3.1. Noise Monitoring Impact Assessment Criteria	30
4.3.2. Noise Monitoring Performance Review.....	31
4.3.3. Noise Monitoring Long Term Analysis and Assessment	35
4.3.4. Noise Monitoring Summary and Opportunities for Improvement.....	36
4.4. Surface Water Monitoring	36
4.4.1. Surface Water Quality Impact Criteria.....	38
4.4.2. Surface Water Monitoring Performance Review.....	39
4.4.3. Historical Surface Water Monitoring Long Term Assessment and Analysis	46
4.4.4. Surface Water Monitoring Summary and Opportunity for Improvements.....	51
4.5. Water Balance.....	51
4.5.1. Surface Water Flows	51



4.5.2.	Water Use for Dust Suppression	52
4.5.3.	Water Use from Production	52
4.6.	Flood Storage Capacity	53
4.6.1.	Stages 2-4:	53
4.6.2.	Stage 5:	54
4.7.	Groundwater Monitoring	56
4.7.1.	Groundwater Monitoring Impact Assessment Criteria	56
4.7.2.	Groundwater Monitoring Current Reporting Period Performance Review	58
4.7.3.	Groundwater Long Term Assessment and Analysis	65
4.7.4.	Groundwater Summary and Opportunities for Improvement	65
4.8.	Rehabilitation and Flora and Fauna Management Review	65
4.8.1.	Rehabilitation Assessment Criteria	65
4.8.2.	Rehabilitation and Flora and Fauna Management Performance Review	66
4.8.3.	Rehabilitation and Fauna and Flora Management Long Term Analysis and Assessment 68	
4.8.4.	Rehabilitation and Flora and Fauna Summary and Opportunities for Improvement ...	68
4.9.	Waste Management	68
4.9.1.	VENM Verification Acceptance and Disposal	68
4.9.2.	Waste Minimisation and Tracking	69
4.9.3.	Waste Minimisation Long Term Trends and Analysis	70
4.9.4.	Waste Management Summary and Opportunities for Improvement	71
4.10.	Incident and Emergency Response Management.	71
4.11.	Dangerous and Hazardous Goods Storage	71
4.12.	Community	71
4.12.1.	Environmental Complaints Management	71
4.13.	Independent Environmental Audit	72
4.14.	Summary of Regulator Notifications	72
5.	Conclusion	73
6.	Activities to be completed by the Next Reporting Period	74
7.	Appendix A Meteorological Monitoring	75
8.	Appendix B Air Quality Additional Data and Graphs	84
9.	Appendix C Annual Noise Monitoring Compliance Report	87
10.	Appendix D Rehabilitation Progress Monitoring	88
11.	Appendix E Ground Water Monitoring Report	96

Tables and Figures

Table 1 Consent Requirements for Annual Review	10
Table 2 Statement of Compliance.....	12
Table 3 Annual Review Compliance Key	12
Table 4 Key Contacts Associated with the Dunmore Lakes Sand Project.....	14
Table 5 Dunmore Lakes Sand Project List of Relevant Approvals.....	17
Table 6 Current Reporting Period Production Data.....	18
Table 7 Current Reporting Period Production Data as Reported to DRG	19
Table 8 Completed Actions (FY22 Annual Review)	19
Table 9 Deposited Dust Impact Assessment Criteria.....	22
Table 10 Deposited Dust Compliance Monitoring Summary.....	23
Table 11 Deposited Dust Background Monitoring Summary	23
Table 12 Particulate Monitoring Assessment Criteria	27
Table 13 Summary of Particulate Matter Monitoring Data	28
Table 14 Summary of Noise Monitoring Data	30
Table 15 Annual Compliance Noise Monitoring Report	32
Table 16 Water Discharge Impact Assessment Criteria.....	38
Table 17 Dunmore Lakes Sand Project Water Quality Objectives	38
Table 18 Surface Monitoring Summary (red denotes an exceedance of the relevant criteria)	40
Table 19 Discharge Surface Water Monitoring Results	41
Table 20 Dredge and Spray Pump Rates.....	52
Table 21 Groundwater Impact Assessment Criteria	57
Table 22 Groundwater Monitoring Summary West of Princes Highway.....	59
Table 23 Groundwater Monitoring Summary East of Princes Highway	61
Table 24 Groundwater Monitoring Summary Stage 5	
Table 25 VENM and PASS Backfilling Volumes	69
Table 26 Waste Tracking Register	70
Table 27 Historical Waste Tracking Summary	70
Table 28 Dunmore Rainfall Summary	76
Table 29 Dunmore Historical Rainfall	76
Table 30 Detail Summary of Historical Dust Data.....	84
Table 31 Detailed Summary of PM ₁₀ Monitoring Data	85
Figure 1 Dunmore Lakes Sand Project Site Layout	16
Figure 2 Air Quality Monitoring Locations	22
Figure 3 DD-2 Deposited Dust Monitoring Summary	24
Figure 4 DD-5 Deposited Dust Monitoring Summary	24
Figure 5 DD-6 Deposited Dust Monitoring Summary	25
Figure 6 DD-10 Deposited Dust Monitoring Summary	25
Figure 7 DD-1 Deposited Dust Monitoring Summary	26
Figure 8 DD-4 Deposited Dust Monitoring Summary	26
Figure 9 Dunmore PM ₁₀ Monitoring Summary.....	27
Figure 10 Historical Deposited Dust Trends.....	28
Figure 11 PM ₁₀ Historical Monitoring Trends	29

Figure 12 Noise Monitoring Historical Noise Monitoring Trends	35
Figure 13 Surface Water Monitoring Locations	37
Figure 14 Stage 2 Pond pH After Accepting PASS	43
Figure 15 Fines Pond 2 After Accepting PASS for Rehabilitation	43
Figure 16 Groundwater pH After Accepting PASS for Rehabilitation	44
Figure 17 Surface Water pH Historical Monitoring Trends.....	46
Figure 18 Surface Water TSS Historical Monitoring Trends.....	47
Figure 19 Surface Water Conductivity Historical Monitoring Trends	48
Figure 20 Surface Water Turbidity Monitoring Historical Trends.....	49
Figure 21 Surveyed Fines Pond Bund.....	53
Figure 23 Groundwater Monitoring Locations and Derived Flow	57
Figure 24 Rehabilitation Area Locations	67
Figure 25 Summary of Historical Complaints.....	72
Figure 26 Weather Station Location	75
Figure 27 July 2024 Wind Rose	77
Figure 28 August 2024 Wind Rose	77
Figure 29 September 2024 Wind Rose	78
Figure 30 October 2024 Wind Rose	78
Figure 31 November 2024 Wind Rose	79
Figure 32 December 2024 Wind Rose.....	79
Figure 33 January 2025 Wind Rose.....	80
Figure 34 February 2025 Wind Rose.....	80
Figure 35 March 2025 Wind Rose.....	81
Figure 36 April 2025 Wind Rose.....	81
Figure 37 May 2025 Wind Rose	82
Figure 38 June 2025 Wind Rose.....	82
Figure 39 Dunmore Seasonal Wind Rose Data	83

List of Abbreviations

ANZECC	Australian and New Zealand Environment Conservation Council
AQMP	Air Quality Management Plan
AR	Annual Review
AS	Australian Standard
BFMP	Bushfire Management Plan
BMP	Blast Management Plan
BOS	Biodiversity Offset Strategy
CCC	Community Consultative Committee
DA 195-8-2004	The development application for the Dunmore Lakes Sand Project operated by Boral Resources (NSW) Pty Ltd
DLSP	Dunmore Lakes Sand Project
DO	Dissolved Oxygen
DPHI	Department of Planning, Housing and Industry
EPA	Environmental Protection Authority
EPA&A Act	Environmental Planning and Assessment Act 1979
EPL 11147	Environmental Protection Licence for the Dunmore Lakes Sand Project operated by Boral Resource (NSW) Pty Ltd
FFMP	Flora and Fauna Management Plan
FY24	Financial Year 2024 (1 July 2023 – 30 June 2024)
GMMP	Groundwater Monitoring Management Plan
HVAS	High Volume Air Sampler
IEA	Independent Environmental Audit
LOR	Limit of Reporting
MOD	Modifications
ML	Megalitres
NATA	National Association of Testing Authorities
NMP	Noise Management Plan
NRAR	Natural Resource Access Regulator
NTU	Nephelometric Turbidity Units
PASS	Potential Acid Sulphate Soil
PIRMP	Pollution Incident Response Management Plan
PM ₁₀	Particulate Matter (10 microns in diameter)
PM _{2.5}	Particulate Matter (2.5 microns in diameter)
POEO Act	Protection of the Environment Operations Act 1997
RMP	Rehabilitation Management Plan



S5.C9	Used to refer to a particular condition in DA-195-8-2004 (in this case Schedule 5, Condition 9).
TSP	Total Suspended Particulates
TSS	Total Suspended Solids
VENM	Virgin Excavated Natural Materials
WMP	Water Management Plan
WQO	Water Quality Objectives
µg/m ³	Micrograms per cubic metre

1. Purpose and Scope

This Annual Review (AR) covers the operation of the Dunmore Lakes Sand Project for the period 1st July 2024 to 30th June 2025 and has been prepared in accordance with the latest Department of Planning, Housing and Infrastructure guidelines. In addition to determining the compliance of the development with the conditions of the consent, DA 195-8-2004 Schedule 5 Condition 9 (S5.C9) requires that the AR reports on specific components of the operation in regard to performance and compliance.

DA 195-8-2004 S5.C9 and all other relevant conditions required to be addressed as part of the AR are outlined in Table 1 with reference to the section of this report where each condition has been addressed. The timeframe for the annual review is the 2025 Financial Year which is 1 July 2024 – 30 June 2025.

Table 1 Consent Requirements for Annual Review

Condition	Condition Requirements	Where addressed in this report
5(9)	By the end of September each year, or other timing as may be agreed by the Planning Secretary, the Applicant must review the environmental performance of the development to the satisfaction of the Planning Secretary. This review must:	
	(a) Describe the development (including rehabilitation that was carried out in the previous financial year, and the development that is proposed to be carried out over the current financial year,	Section 4.8
	(b) Include a comprehensive review of the monitoring results and complaints records of the development over the previous financial year, which includes a comparison of these results against: - The relevant statutory requirements, limits or performance measures/criteria; - Requirements of any plan or program required under this consent; - The monitoring results of previous years; and - The relevant predictions in the documents listed in condition 2(c) of Schedule 2;	Section 4
	(c) identify any non-compliance or incident which occurred in the previous financial year, and describe what actions were (or are being) taken to rectify the non-compliance and avoid reoccurrence;	Section 1.1
	(d) evaluate and report on:	Section 4

	- the effectiveness of the noise and air quality management systems; and - compliance with the performance measures, criteria and operating conditions of this consent;	
	(e) Identify any trends in the monitoring data over the life of the development;	Section 4
	(f) Identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and	
	(g) Describe what measures will be implemented over the current financial year to improve the environmental performance of the development.	Section 4
	The Applicant must ensure that copies of the Annual Review are submitted to the Planning Secretary and Council and are available to the Community Consultative Committee (see condition 6 of Schedule 5) and any interested person upon request.	
3(21)	The Applicant must report on water extracted from the site each year (direct and indirect) in the Annual Review, including water taken under each water licence.	Section 4.5
3(27)	The Applicant must ensure that the flood storage capacity of the site is no less than the pre-existing flood storage capacity at all stages of the development. Details of the available flood storage capacity must be reported in the Annual Review.	Section 4.6
3(57)	The Applicant must maximise the use of rail transport for delivery/despatch outside the Illawarra Region, to the satisfaction of the Secretary. Details of transportation modes and measures to assess and encourage rail transport must be provided in the Annual Review.	Section 2.5 and 2.6
3(64)	The Applicant must (a) manage on-site sewage treatment and disposal in accordance with the requirements of an applicable EPL, and to the satisfaction of EPA and Shellharbour Council; (b) minimise the waste generated by the development; (c) ensure that the waste generated by the development is appropriately stored, handled, and disposed of; and	Section 4.9

	(d) report on waste minimisation and management in the Annual Review.	
3(72)	The Applicant must: (e) Provide annual production data to the MEG using the standard form for that purpose; and (f) Include a copy of this data in the Annual Review.	Section 2.5

1.1. Statement of Compliance

The statement of compliance for the current reporting period (1 July 2024 – 30 June 2025) is contain in Table 2 below

Table 2 Statement of Compliance

Were all conditions of the relevant approval(s) complied with?	
DA-195-8-2004	No

One non-compliances were identified in the reporting period arising from the Dunmore Lakes Sand Project (DLSP) development activities. A number of observations are recorded in Table 3, where certain external events led to impacts in the DLSP monitoring data. The DPHI Annual Review Guidelines Compliance Status key is outlined in Table 3.

Table 3 Annual Review Compliance Key

Relevant Approval	Condition #	Condition Description	Compliance Status	Comments	Section addressed
DA 195-8-2004	S3.C24	Applicant must ensure that water quality in the dredge ponds and groundwater comply with the water quality objectives (WQO) in Table 7 or other such levels as approved by the secretary. Note: The Department acknowledges that short	Low Exceedances are attributed to external events not associated with the Development	There were several minor exceedances of the Groundwater WQO's over the reporting period, all of which were short term and likely responses to rain events and tidal influences. Should any persistent exceedances be noted, they will be duly investigated. As described in the groundwater monitoring report and section 4.7 a number of exceedances of	Section 4.7.2

Relevant Approval	Condition #	Condition Description	Compliance Status	Comments	Section addressed
		term exceedances of these objectives may occur during natural events such as heavy rainfall or tidal saline water inflow		various analytes occur within the groundwater bores against Site specific trigger values. These exceedances are considered natural occurrences, and /or related to tidal impacts. Short term exceedances are acknowledged in S3 C24 Table 5 Note and may occur.	

Risk Level	Colour Code	Description
High	Non-compliant	Non-compliance with potential for significant environmental consequences, regardless of the likelihood of occurrence
Medium	Non-compliant	Non-compliance with: • potential for serious environmental consequences, but is unlikely to occur; or • potential for moderate environmental consequences, but is likely to occur
Low	Non-compliant	Non-compliance with: • potential for moderate environmental consequences, but is unlikely to occur; or • potential for low environmental consequences, but is likely to occur
Administrative	Non-compliant	Only to be applied where the non-compliance does not result in any risk of environmental harm (e.g. submitting a report to government later than required under approval conditions)



Copies of the AR will be submitted to the DPHI, Shellharbour Council, members of the CCC and made available to the public at on the DLSP operations website:

<https://www.boral.com.au/locations/boral-dunmore-operations>

Key contacts associated with the management of the DLSP, environment, safety and stakeholder relationships are provided in Table 4.

Table 4 Key Contacts Associated with the Dunmore Lakes Sand Project

Contact	Position	Contact Details
Stuart Mclean	DSS Quarry Manager	Tel: (02) 4237 8414 Email: stuart.mclean@boral.com.au
Brodie Bolton	Metropolitan Operations Manager NSW/ACT	Tel: (02) 4237 8414 Email: brodie.bolton@boral.com.au
Ionut Ciobanu Oprea	Environmental Coordinator Dunmore	Tel: (02) 0409 745 832 Email: ionut.ciobanuoprea@boral.com.au
Kate Woodbridge	Stakeholder Relations Manager	Tel: (02) 4237 8414 Email: kate.woodbridge@boral.com.au

2. Site Operations

The Dunmore Lakes Sand Project (DLSP) is an established dredge sand extraction operation at Dunmore, in the Illawarra region of New South Wales. It is owned by Dunmore Sand & Soil Pty Ltd, which is a wholly owned subsidiary of Boral Resources (NSW) Pty Ltd (Boral).

The project is an integral part of the NSW construction industry, as it supplies high quality construction sand products to the Illawarra and Greater Sydney regions. The DLSP has a maximum approved production rate of up to 800,000 tonnes per annum and average historical production rate of 450,000 tonnes per annum. It has historically been capable of supplying around 7.5% of the sand required for Sydney's construction industry, however production during the 2025 reporting period was impacted by flooding.

Development Consent (DA 195-8-2004) was issued 29 June 2005 for stages 2, 3 and 4 by the Minister for Infrastructure and Planning and in November 2020 for Stage 5. It allows Boral to produce up to 800,000 tonnes of product per year and transport it offsite by road and rail to local and regional markets.

The project is currently operating under development consent DA 195-8-2004, which has been modified three times as summarised below, and allows Boral to carry out sand extraction and processing operations until 2031.

- Modification 1 (granted in June 2016) which involved modifying S3.C10 of the consent to remove the requirement for the creek realignment to occur prior to commencing Stage 3 extraction. This allowed realignment to be carried out a later date, concurrent with extraction operations as per the private landowners request;
- Modification 2 (granted in March 2020) which involved permitting the processing, blending and sale of up to 120,000 tonnes per annum of sand based VENM (known as excavation sand) from ongoing building projects within the surrounding regions. (
- Modification 3 granted in November 2020) which involved establishing two new extraction areas, known as Stages 5A and 5B, within the existing approved life of the operations. These proposed extraction areas are situated on a private property located between the Princes Highway, Riverside Drive and the Minnamurra River;

The development consent DA 195-8-2004 as it currently stands allows Boral to:

- extract, process and transport sand products, including through the:
 - extraction of up to 800,000 tonnes of sand per annum until 2031;
 - development of extraction areas for dredging in Stages 2 to 5;
 - processing of extracted sand and up to 120,000 tonnes per annum of suitable imported Virgin Excavated Natural Material (VENM) to produce construction sand products;
 - road and rail transport of product sand, primarily to the Illawarra and Greater Sydney regions;
- construct and operate a range of ancillary infrastructure at the site, including:
 - a processing plant;
 - product stockpiles;

- access roads; and
- supporting administrative infrastructure.
- Undertake progressive rehabilitation via the importation of VENM material for the purposes of void reclamation and revegetate as per the approved Rehabilitation Management Plan.

A layout of the site is illustrated in Figure 1. Please note that Stage 1 operations have ceased and rehabilitation was signed off in 2014. Stages 2 and 3 are not currently undergoing extraction and rehabilitation is underway.

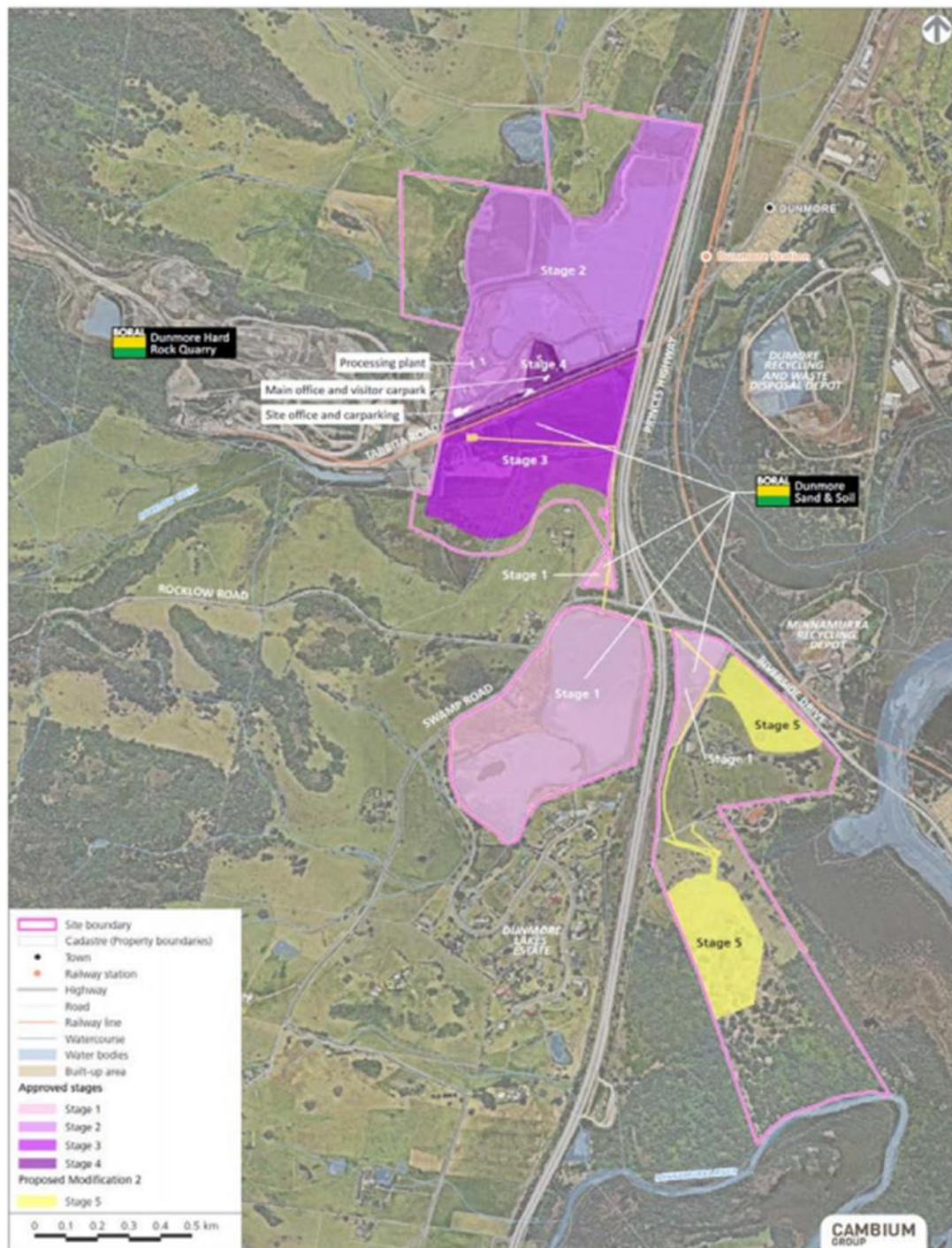


Figure 1 Dunmore Lakes Sand Project Site Layout

2.1. List of Relevant Approvals

A summary of all the relevant approvals relevant to DLSP are provided in Table 5.

Table 5 Dunmore Lakes Sand Project List of Relevant Approvals

Approval Type	Approval Authority	Approval No.	Date Granted
Development Consent	Department of Planning & Environment	195-8-2004 (as modified)	29/06/2005
Environment Protection Licence	Environment Protection Authority	11147	04/05/04
Water Extraction Licence	Natural Resource Access Regulator (NRAR)	WAL24477	01/02/2018
Controlled Activity Approval	Natural Resource Access Regulator (NRAR)	10CX123242 (10 ERM2010/1116)	5/08/2019
		10CX122266	18/12/2018

2.2. Modifications Approved in the Last 12 Months

No additional modifications have been sought to the current approval over the 2025 reporting period. The current consent allows for an additional extraction area (Stage 5) to the south of the former Stage 1 extraction area which was commenced during the 2023 reporting period. Stage 5 encompasses an area of 38 hectares (ha) and includes two separate extraction areas, Stage 5A and Stage 5B. The sand resource to be extracted from Stage 5A is estimated at 234,000 t and approximately 1,123,000 t from Stage 5B. These resource volumes are the estimated sand resource only, and additional tonnage of soil material (known as overburden) will be extracted in addition to the sand resource.

An overland transfer pipeline has been established from the Stage 5 extraction areas to the existing Stage 2 processing area. This pipe was transferred from Stage 5A to Stage 5B once extraction activities commenced. At the Stage 2 processing area, the sand and water pass over an initial screen to separate oversize organic matter or debris and into a large wash tank to float out any fines. The sand is then pumped through a cyclone and stockpiled for further dewatering. Water drains to an existing fines pond and a secondary settling pond, then it flows into Stage 3 pond before being pumped back to the Stage 5B dredge pond.

Dewatered sand is then loaded with a front-end loader for dispatch by road and rail. Water pumped from the Stage 5 extraction areas is returned to these extraction areas via the transfer pipeline. Mobile plant and equipment is operated across both extraction areas. Extraction methods are identical to those used in Stages 2 and 3.

Approved management plans are available on the Dunmore website <https://www.boral.com.au/locations/boral-dunmore-operations>

2.3. Operations last 12 months

Sand production has continued at Stage 5B, during the last 12 months. Rehabilitation of Stage 5A has continued with the backfilling of VENM as weather and market conditions have allowed. Backfilling and rehabilitation have continued in Stages 2 and 3 and will continue during the coming reporting periods.

2.4. Operations next 12 months

The dredge will continue to excavate deeper in its current location at Stage 5B and produce sand for our customers. The backfilling and final rehabilitation of Stage 5A will be completed, weather dependant. Rehabilitation of Stages 2 and 3 will continue.

There are no planned changes to plant operations, with sand continuing to be processed in the existing stage 2 processing area.

2.5. Production, Sales and Transport

A summary of production for the current reporting period is shown below in Table 6. The current reporting period production data as reported to the Department of Resources and Geoscience (DRG) is shown in Table 7.

Table 6 Current Reporting Period Production Data

Month	Production (t)	Sales (t)
July 24	30,752	18,026
Aug 24	31,410	18,873
Sept 24	30,551	22,106
Oct 24	23,735	22,210
Nov 24	28,532	20,202
Dec 24	19,370	15,048
Jan 25	20,638	11,172
Feb 25	5,620	13,661
Mar 25	23,770	14,191
Apr 25	22,075	12,298
May 25	31,710	22,123
Jun 25	29,540	16,935
Total	297,703	206,844

Table 7 Current Reporting Period Production Data as Reported to DRG

Product	Quantity Tonnes current reporting period
Virgin Materials Crushed Coarse Aggregates	
Over 75mm	
Over 30mm to 75mm	
5mm to 30mm	
Under 5mm	
Natural Sand	
Manufactured Sand	
Prepared Road Base & Sub Base	
Other Unprocessed Materials	
Construction Sand Excluding Industrial	297,703
Industrial Sand	
Foundry, Moulding	
Glass	
Other (Specify)	
TOTAL SITE PRODUCTION	297,703

2.6. Production Sales and Transport Next 12 Months

Production will continue in a similar trajectory over the next 12 months with extraction from Stage 5B continuing. VENM intake will continue at both Stage 5A and at Stage 2.

3. Actions to be completed from the Last Annual Review

Table 8 lists specific actions from the 2023/24 AR that were required to have been undertaken during the 2024/25 reporting period.

Table 8 Completed Actions (FY24 Annual Review)

Aspect	Actions Taken	Section Discussed
Continue rehabilitation monitoring of planted sections of Swamp Oak Forest and Freshwater Wetland EEC in Stage 2 and Re-aligned Western Tributary.	Rehabilitation and Maintenance of planted sections by licenced bush regenerators has continued. Progress photos are included in Appendix E.	Appendix E

Continue backfilling and landform construction in Stage 2 and 3.	Backfilling of Stage 3 Eastern edge has continued using VENM. Stage 2 backfilling continued with a combination of VENM and PASS.	Section 4.4.2.3 and 4.9
Continue backfilling and landform construction in Stage 5a;	Backfilling in Stage 5a on-going.	
Plant out a further section of Swamp Oak forest on the eastern edge of Stage 2.	Planting of Swamp Oak Forest has been confirmed for September 2025. Delays until September were implemented to optimise establishment opportunities for the plants. Also, the wet weather played a big part in ground preparations delays.	
Continue assessing salinity in the southern section of Stage 3 as per the recommendations in the DLSP EIS.	Salinity has been observed to decrease as dredging ceased in the southern section of Stage 3 and the saline section of Rocklow Creek.	Section 4.4.4, 4.13 and 4.14
Proceed with Stage 5 operations as per the associated management plans	Stage 5 Operations on-going.	
Update Stage 2-4 Water Management for the use of site specific trigger values as per the independent auditor recommendations and to align with Stage 5 Soil and Water Management Plan.	Water Management Plan has been updated and will be submitted in September 2025.	
Continue ecological assessment program in relation to the use of nest boxes; and	Ecological Assessment Program has been established – first round of Nest Box inspections was completed in September 2024. A Second round of inspections was achieved in June 2025. Looking forward, following the inspections report, maintenance and repair of damaged nest boxes will be scheduled in spring 2025.	
Broaden the analyte suite for monitoring point DW16 in accordance with the PRP recommendations.	Monitoring suite has been updated as per PRP recommendations. Additional PRP added February 2025.	
Review GMMP triggers	To be conducted in the following reporting period.	

4. Environmental Performance

DLSP has comprehensive management and monitoring programs, which collect information and data to enable the assessment of environmental impacts, regulatory compliance and performance against continual improvement objectives. Specific Management Plans define the framework for measuring environmental performance and compliance with statutory requirements for each relevant aspect of environmental performance

4.1. Meteorological Monitoring

An onsite weather station is located at DLSP which collects a range of meteorological parameters. This system was upgraded as part of the transition to real time air quality monitoring at Dunmore Quarry. The location of the weather station is shown in Appendix A.

There are currently no prescribed impact assessment criteria associated with the weather station monitoring data, with the meteorological monitoring used to provide background information for the management of the site. A detailed summary of the current reporting period and historical rainfall data can be found in Appendix A.

4.1.1. Meteorological Monitoring - Long Term Analysis and Trends

The current reporting period was close to the regional average, with 944mm of rain falling over the reporting period. The highest volume month was May 2025, which experienced 207.8mm of rainfall.

Typically winds during the reporting period originated from the west and west-south-west for the majority of the year. In summer, prevailing winds were also from the north-east. These results are mostly consistent with historic trends and generally had a greater concentration of winds from the west and north-east.

4.1.2. Meteorological Monitoring Summaries and Opportunities for Improvement

The weather station is now capable of providing real time data via download, which is an upgrade from the previous station. The next reporting period will focus on continuing the processes established during the current reporting period.

4.2. Air Quality Monitoring

Two methods of monitoring air quality are used at DLSP. Deposited dust gauges are used to measure the value of deposited dust every 30 days (+/- 2 days). A High Volume Air Sampler (HVAS) is used to measure fine particulate matter under 10 microns (PM₁₀) every 6 days.

The locations of the compliance air quality monitoring locations are shown below. As part of the Air Quality Monitoring Plan (AQMP) the site also monitors the following locations depicted in green in Figure 2 as background data for the Stage 1/Stage 5 operations.



Figure 2 Air Quality Monitoring Locations

4.2.1. Deposited Dust Assessment Criteria

Deposited Dust impact criteria is assessed at a residence located on privately owned land. It is important to note that the assessment criteria refers to an annual averaging period (i.e. the rolling monthly average over the last 12 months).

The Impact Assessment Criteria is shown in Table 9.

Table 9 Deposited Dust Impact Assessment Criteria

Pollutant	Averaging Period	Criterion	
Deposited Dust ^c	Annual	2g/m ² /month ^b	4g/m ² /month ^{a,d}
^a Cumulative impacts (i.e. increases in concentration due to development plus all other sources) ^b Incremental impact (i.e. increases in concentration alone, with zero allowable exceedances of criteria over the life of the development. ^c Deposited dust is defined as insoluble solids ^d Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents or any other activity as agreed by the Secretary.			

4.2.2. Deposited Dust Monitoring Performance Review

All air emission monitoring sites were below the required assessment criteria for dust measured as insoluble solids over the annual averaging period. All sites were also below the 4g/m²/month for the ash fraction, which excludes the organic (combustible) components of the dust sample such as vegetation, bird droppings and insects. These organic contaminants within the sample are typically representative of the surrounding wetlands and farmland areas within which the monitors are located.

A summary of deposited dust results measure at the gauge for the four compliance monitoring points is shown in Table 10 below. Additional dust monitoring is undertaken as background and shown in Table 11.

Table 10 Deposited Dust Compliance Monitoring Summary

Month	DD-2 (EPL2) grams/m ² /month		DD-5 (EPL4) grams/m ² /month		DD-6 (EPL8) grams/m ² /month		DD-10 (EPL7) grams/m ² /month	
	Insoluble Solids	Ash	Insoluble Solids	Ash	Insoluble Solids	Ash	Insoluble Solids	Ash
FY25 average	1.59	0.75	5.16	1.93	1.66	0.83	2.03	0.95
Criteria	4	-	4	-	4	-	4	-

Table 11 Deposited Dust Background Monitoring Summary

Month	DD-1 grams/m ² /month		DD-4 grams/m ² /month	
	Insoluble Solids	Ash	Insoluble Solids	Ash
FY25 average	2.61	1.39	2.46	0.84
Criteria	4	-	4	-

Monitoring sites recorded similar values for insoluble solids, indicating that regional conditions are the largest contributors to measured dust levels rather than development operations at DLSP. These findings are within expectations as resource extraction at DLSP is a wet process.

The DD-4 monitoring location was observed to be significantly higher for insoluble solids than for ash. This is within expectation as the DD-4 monitor is located in the immediate vicinity of the constructed wetlands as part of the Stage 1 rehabilitation at Swamp Road. Often DD-4 has more insects and vegetation within the dust sample, which is reflective of the surrounding land use rather than the DLSP operations.

The DD-1 and DD-4 monitoring locations are not compliance monitoring points, however measured dust as insoluble solids are still below the impact assessment criteria of 4g/m²/month.

Elevated readings for insoluble solids were recorded in the month of December 2024 at DD-1, December 2024, January 2025 and May 2025 at DD-5. The wind direction was predominantly from the West in December and May and from the West and South West in January (see Figure 32, 33 and 37 in Appendix A). These wind directions are not from the

direction of DLSP operations at these monitoring locations and are likely reflective of ambient conditions rather than operations.

The rolling 12-month average for insoluble solids at each monitoring location, except DD-5 Creagan Residence, was below $4\text{g/m}^2/\text{month}$, as shown by the green line in Figure 3 to 8. The high values for December 2024, January 2025 and May 2025 mentioned above contributed to an higher average than the goal. The trends, however, show an overall decrease in insoluble solids values. It should be noted December 2024 DD5 sample was observed to have a dark colour and strong odour, suggesting potential fauna influence.

It is important to note that the Creagan property was acquired by the business during the reporting period.

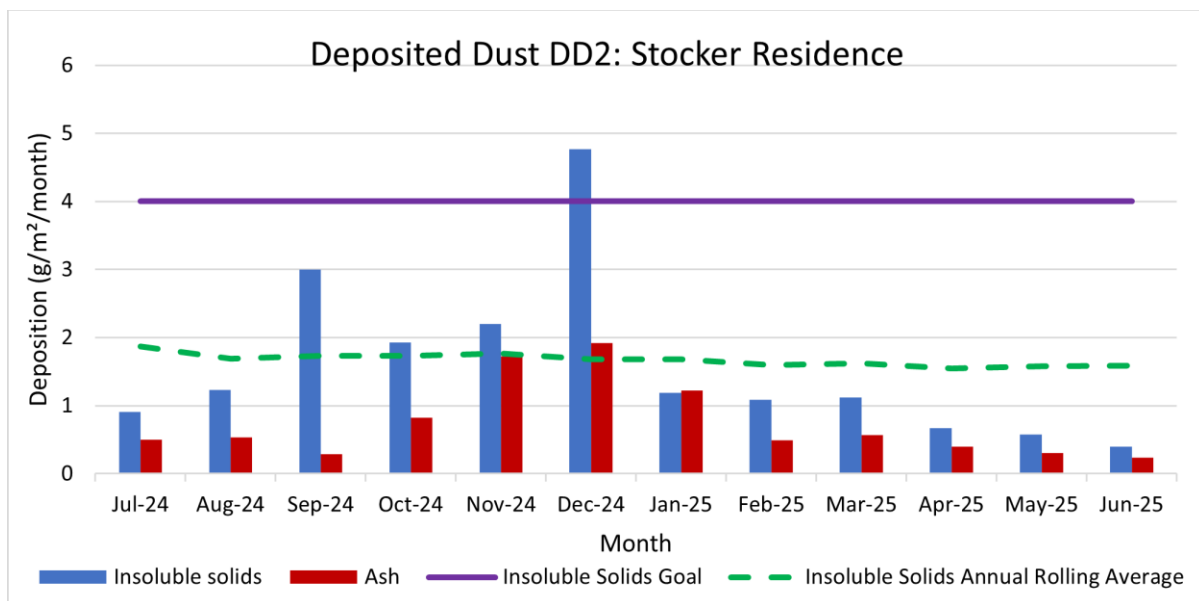


Figure 3 DD-2 Deposited Dust Monitoring Summary

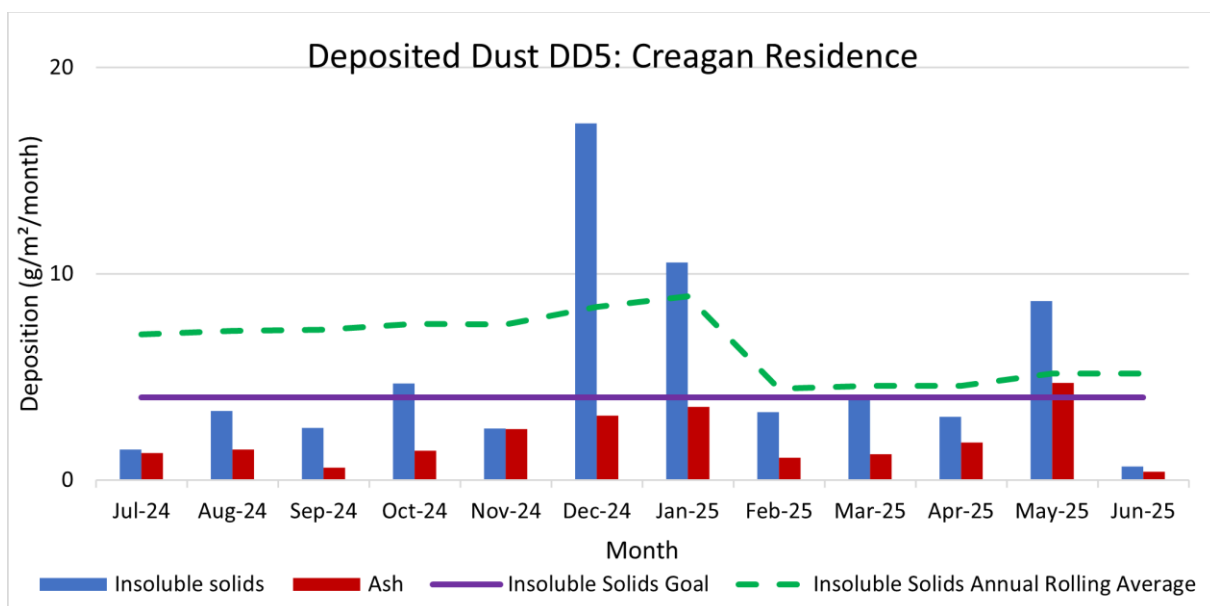


Figure 4 DD-5 Deposited Dust Monitoring Summary

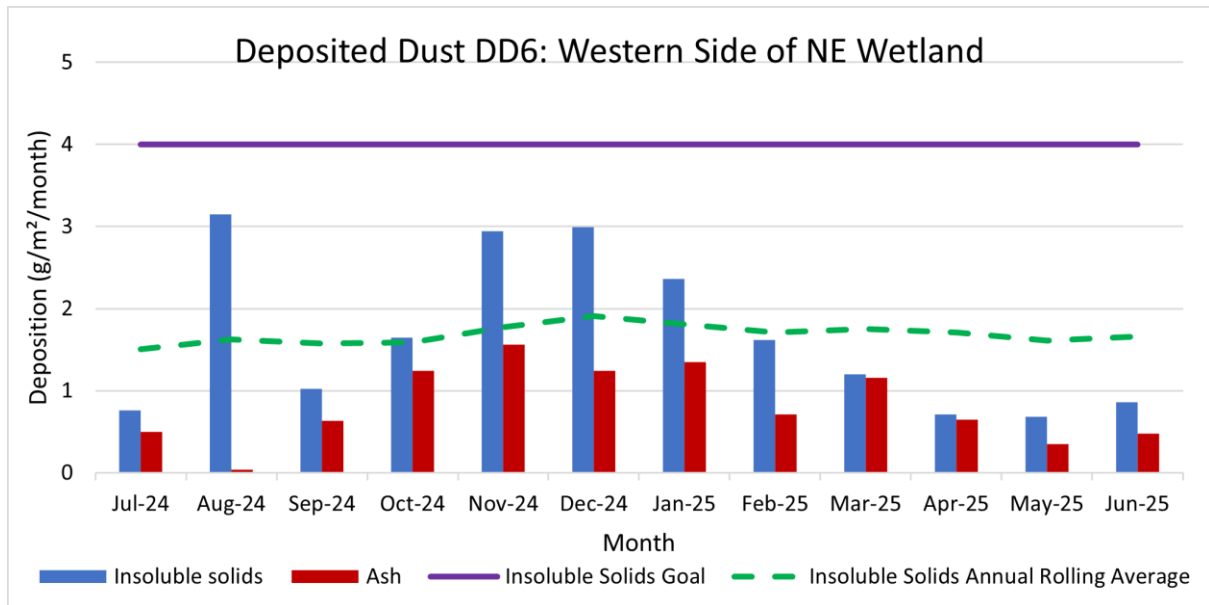


Figure 5 DD-6 Deposited Dust Monitoring Summary

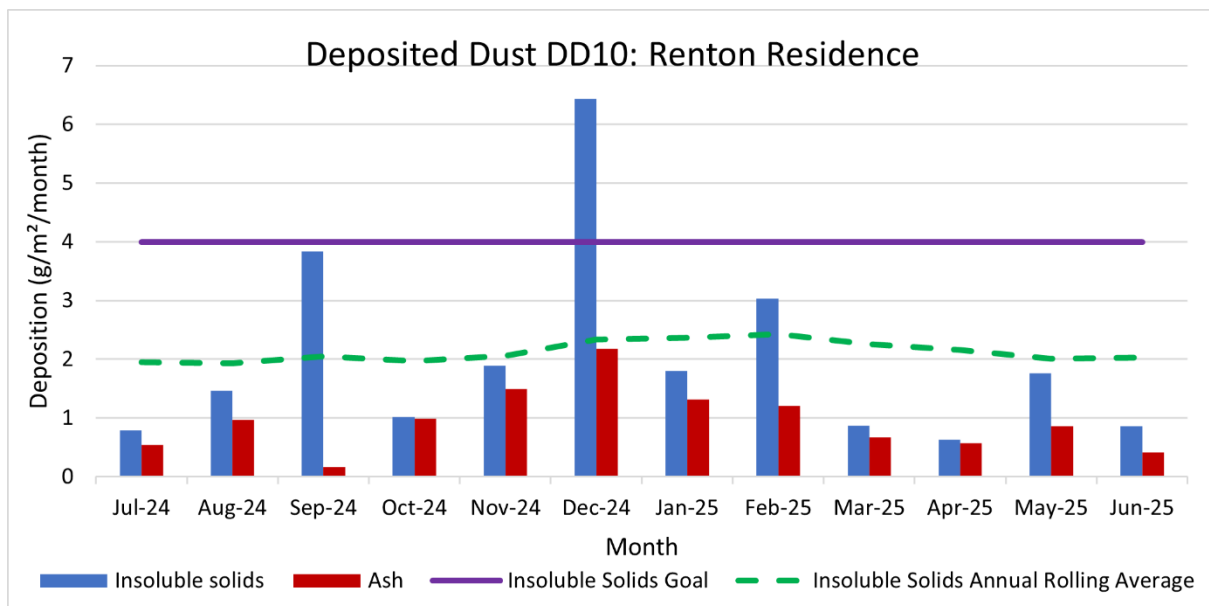


Figure 6 DD-10 Deposited Dust Monitoring Summary

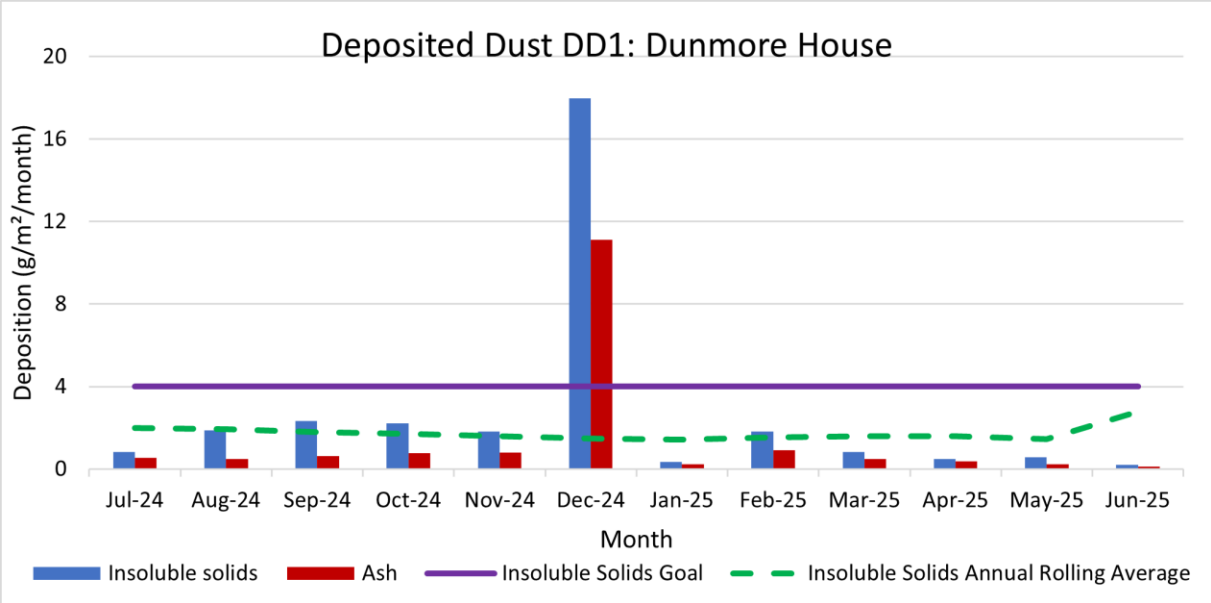


Figure 7 DD-1 Deposited Dust Monitoring Summary

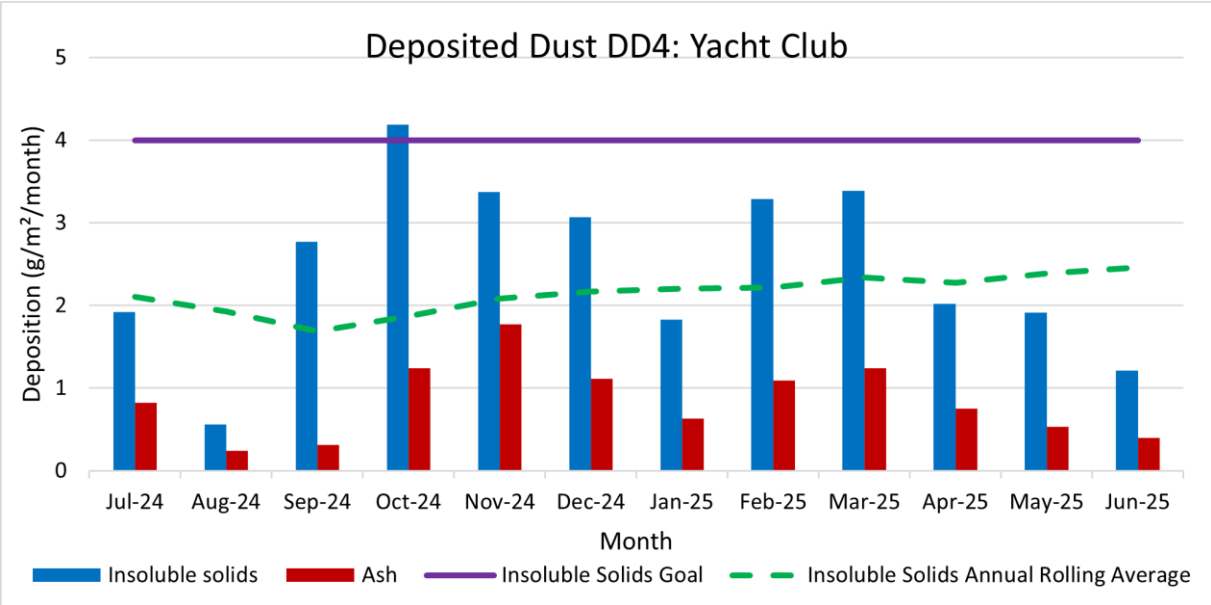


Figure 8 DD-4 Deposited Dust Monitoring Summary

4.2.3. Particulate Monitoring Assessment Criteria

The impact assessment criteria for Particulate Monitoring as per Condition S3.C19 of the consent is shown below in Table 12.

Table 12 Particulate Monitoring Assessment Criteria

Pollutant	Averaging Period	Criterion
PM ₁₀	Annual	^{a,d} 25 µg/m ³
PM ₁₀	24 hour	^b 50 µg/m ³
TSP	Annual	^{a,d} 90 µg/m ³

a Cumulative impacts (ie increases in concentration due to development plus all other sources) b Incremental impact (ie increases in concentration alone, with zero allowable exceedances of criteria over the life of the development. d Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents or any other activity as agreed by the Secretary

4.2.4. Particulate Monitoring Performance Review

PM₁₀ readings from the current reporting period can be seen in Figure 9 below.

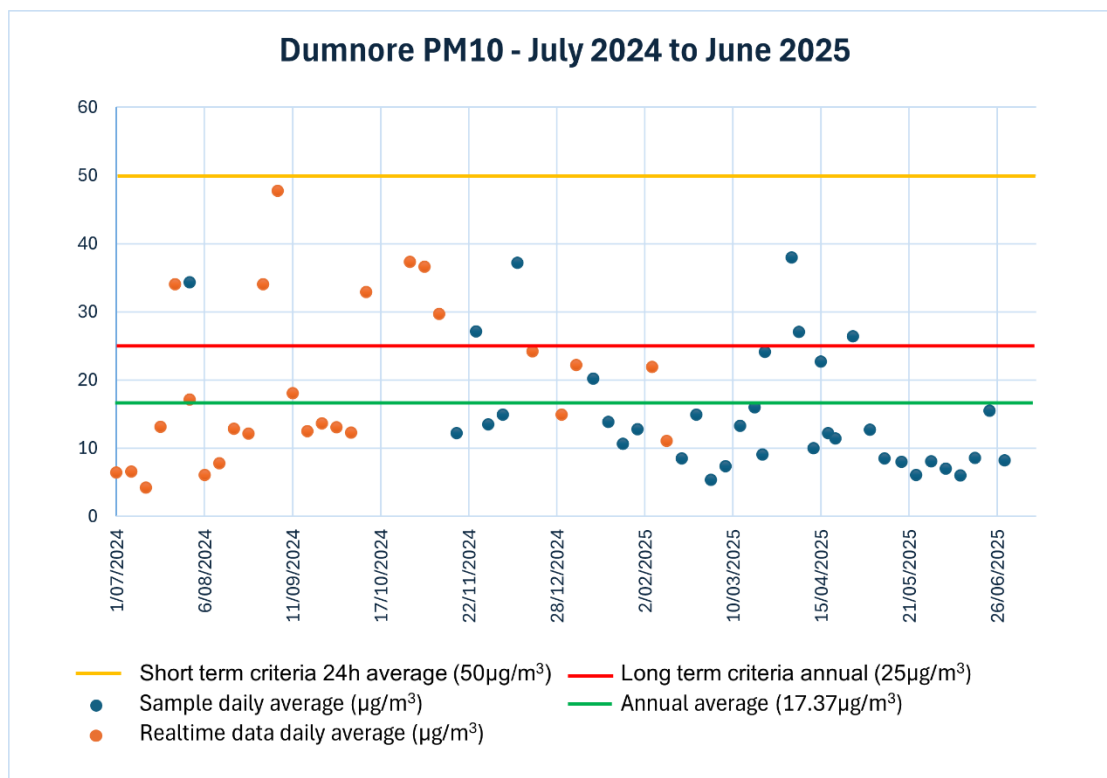


Figure 9 Dunmore PM₁₀ Monitoring Summary

The annual average PM₁₀ measurement for the reporting period was below the long-term impact assessment criteria of 25 µg/m³ for PM₁₀ and 90 µg/m³ for TSP. The PM₁₀ measurements were also similar to the Albion Park South air quality monitoring station's annual averages.

There were no readings recorded as occurring above the long-term criteria for PM₁₀ of 50µg/m³ during the reporting period. Incorrect sampling regime and associated results have been omitted and supplemented with the real-time air quality data. As seen in figure 7, results from the real-time monitoring system were within consent requirements of 50µg/m³ over a 24-hour period.

TSP concentrations are not measured in the vicinity of the quarry, however annual average TSP concentrations can be derived based on typical ratios of PM₁₀: TSP. Rural areas (such as DLSP), typically experience a PM₁₀: TSP ratio of 0.4. This ratio has been applied to the annual average PM₁₀ concentrations to derive a representative TSP background concentration in µg/m³. This methodology is in-line with the method used by Ramboll in the MOD 9 Environmental Assessment for the Dunmore Quarry.

Table 13 Summary of Particulate Matter Monitoring Data

Pollutant	Dunmore Quarry current reporting period average (µg/m ³)	Albion Park current reporting period average(µg/m ³)	Dunmore Quarry Long Term average (µg/m ³)
Measured HVAS PM ₁₀	17.37	14.18	12.47
Derived TSP	43.43	37	31.18

4.2.5. Air Quality Monitoring Long Term Analysis and Trends

A graph of long-term trends can be found in Figure 10 below and typically shows that deposited dust observed at the site has decreased over time.

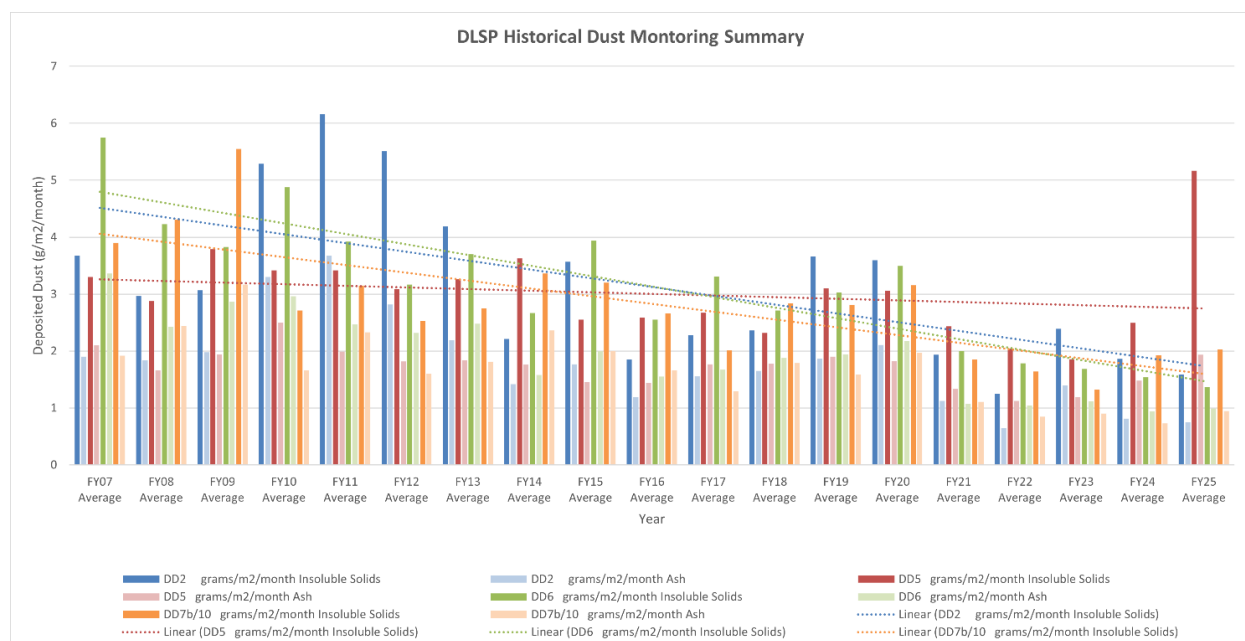


Figure 10 Historical Deposited Dust Trends

A general trend that has been observed, is that measured deposited dust is typically higher in dry summer months than winter months, which is to be expected. This trend is also confirmed by the PM₁₀ measurements and is generally reflective of regional conditions as a whole.

Figure 11 shows a 90-day average in black, which illustrates a seasonal fluctuation of measured PM₁₀ values. A trend can be observed whereby PM₁₀ values are typically higher during summer dry periods and are lower during the winter periods.

This fluctuation is mirrored in the OEH Albion Park PM₁₀ monitor available on the OEH website (<https://www.dpie.nsw.gov.au/air-quality/air-quality-data-services/data-download-facility>).

These trends indicate the measured PM₁₀ and deposited dust values are typically influenced by ambient local conditions rather than development operations at DLSP.

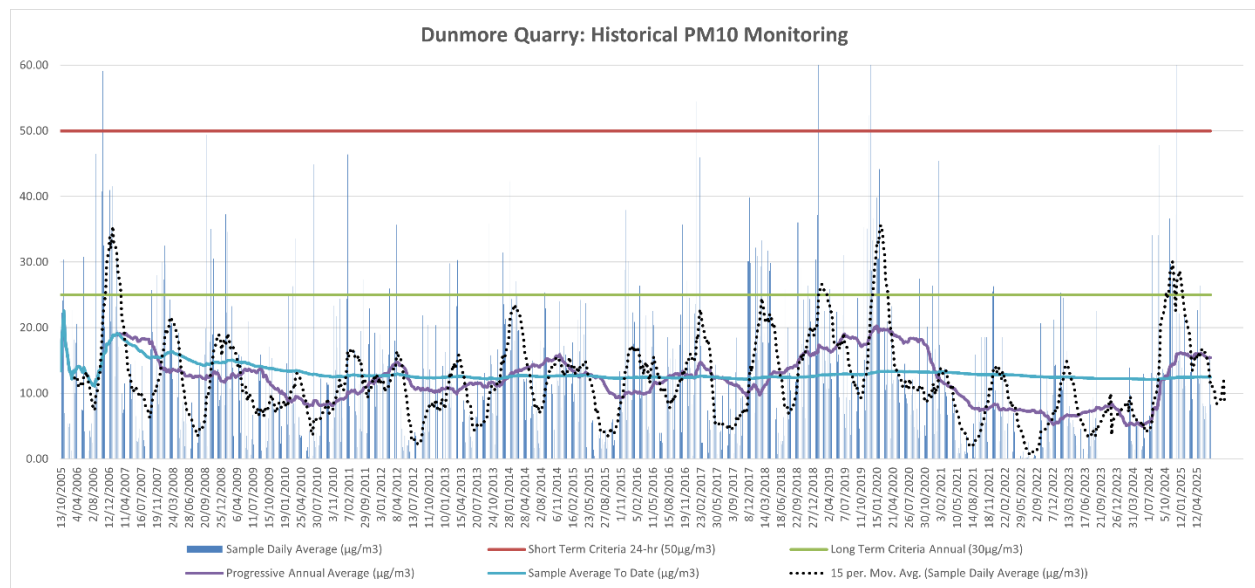


Figure 11 PM₁₀ Historical Monitoring Trends

4.2.6. Air Quality Monitoring Summary and Opportunities for Improvement

Deposited dust measurements were observed to occur below the impact assessment criteria for all compliance monitoring points. Derived TSP and PM₁₀ measurements were generally observed to be below the impact assessment criteria for all time periods. Analysis of long-term monitoring trends typically suggest that local ambient regional conditions have a greater impact on air quality results than DLSP operations.

Resource extraction at DLSP occurs as a wet operation via dredging with an associated low risk of mobilising dust or particulate matter. Dust mitigation methods and controls on site have been effective at minimising any generated dust or particulate matter.

As part of the updated AQMP, DLSP utilises the real time dust monitoring network from the adjacent Boral Dunmore Quarry operations. This has allowed a proactive approach in identifying and reacting to adverse meteorological and air quality conditions as per the approved trigger action response plan which forms part of the Air Quality Management Plan.

4.3. Noise Monitoring

Annual Noise Monitoring is undertaken during winter each year to determine the contribution by DLSP to noise impacts experienced at nearby private residences. The annual noise monitoring undertaken during the current reporting period indicated compliance with the relevant noise limits.

4.3.1. Noise Monitoring Impact Assessment Criteria

Associate noise limits extracted from L3.1 in EPL 11147 and S3.C13 from DA 195-8-2004 are reproduced below in Table 14.

Table 14 Summary of Noise Monitoring Data

Table 1 Development Consent Criteria				
Receiver Location ¹	Day	Evening	Night	Morning Shoulder
	(7am - 6pm)	(6pm - 10pm)	(10pm - 12am)	(6am - 7am)
	dB LAeq(15min)	dB LAeq(15min)	dB LAeq(15min)	dB LAeq(15min)
Dunmore Village residences – 31 Shellharbour Road	49	44	41	47
R20	49	44	38	47
R3, R11, R12, R13, R14, R15, R16, R17, R18, 79 Fig Hill Lane	48	43	38	48
R19	47	43	38	46
R4, R5, R6, R7, R8, R9, R10	47	43	38	43
Renton (183 James Road, Dunmore)	46	43	37	46
All other residences	40	35	35	35

Note 1: Referenced from DLSP DC Table 1 and DLSP NMPv7 Table 7.

Table 2 Maximum Noise Trigger Levels		
Receiver Location	Night ¹	Morning Shoulder ¹
	(10pm - 12am)	(6am - 7am)
	dB LAmax	dB LAmax
R1, R2, R3, R11, R12, R13, R14, R15, R16, R17 and R18	61	
R4, R5, R6, R7, R8, R9, R10	53	
R19	56	

Note 1: Referenced from DLSP NMPv7 Table 8.

4.3.2. Noise Monitoring Performance Review

Noise monitoring was conducted in accordance with the Noise Management Plan (V5) and in general accordance with the NSW Environment Protection Authority (EPA), Noise Policy for Industry (NPfI). The results of the monitoring are summarised within the Annual Noise Monitoring Assessment 2024, prepared by Muller Acoustic Consulting Pty Ltd and included in Appendix C.

The report includes a compliance assessment summary for each monitoring location (refer table 14) which is excerpted in Table 15. It illustrates that annual noise monitoring data complied with project noise limits described all times.

Table 15.1 Annual Compliance Noise Monitoring Report DN-6

Table 5 DN-6 – Operator Attended Noise Monitoring Results								
Date	Time (hrs) ¹	Descriptor (dBA re 20µPa)					Meteorology ²	Description and SPL, dBA
		L _{Amax}	L _{A10}	L _{Aeq}	L _{A90}	L _{Amin}		
21/08/2024	06:31 (Morning Shoulder)	68	56	54	52	49	WD: NW WS: 0.1m/s Stab: E	Traffic 49-56
								Birds 45-68
								Livestock <45
								DLSP inaudible
DLSP Site L _{Aeq} (15min) Contribution								<42
DLSP Site L _{Amax} (15min) Contribution								<42
21/08/2024	07:45 (Day)	66	55	54	51	49	WD: NW WS: 0.1m/s Stab: E	Traffic 49-58
								Birds 45-66
								Livestock 45-50
								Insects <45
DLSP inaudible								
DLSP Site L _{Aeq} (15min) Contribution								<41
21/08/2024	08:00 (Day)	63	53	51	49	48	WD: NW WS: 0.1m/s Stab: E	Traffic 45-55
								Birds 45-63
								Livestock <45
								DLSP inaudible
DLSP Site L _{Aeq} (15min) Contribution								<39
20/08/2024	21:07 (Evening)	66	59	55	48	42	WD: NE WS: 0.1m/s Stab: n/a	Traffic 42-66
								Livestock <40
								DLSP inaudible
								DLSP inaudible
DLSP Site L _{Aeq} (15min) Contribution								<38
20/08/2024	22:24 (Night)	66	58	54	42	37	WD: NE WS: 0.5m/s Stab: F	Traffic 36-66
								Insects 35-40
								DLSP inaudible
								DLSP inaudible
DLSP Site L _{Aeq} (15min) Contribution								<35
DLSP Site L _{Amax} (15min) Contribution								<45

Note 1: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Morning Shoulder - the period from 6am to 7am; Night - the remaining periods.

Note 2: Data from on-site weather station or attended operator observations.

Table 16.2 Annual Compliance Noise Monitoring Report DN-7

Table 6 DN-7 – Operator Attended Noise Monitoring Results								
Date	Time (hrs) ¹	Descriptor (dBA re 20µPa)					Meteorology ²	Description and SPL, dBA
		L _{Amax}	L _{A10}	L _{Aeq}	L _{A90}	L _{Amin}		
21/08/2024	06:05						WD: NW	Traffic 59-71
	(Morning Shoulder)	71	67	65	62	59	WS: 0.1m/s	Birds <55
							Stab: F	DLSP inaudible
		DLSP Site L _{Aeq} (15min) Contribution						<43
		DLSP Site L _{Amax} (15min) Contribution						<43
21/08/2024	07:05						WD: NW	Traffic 60-70
	(Day)	70	67	65	63	60	WS: 0.1m/s	Birds <60
							Stab: E	DLSP inaudible
		DLSP Site L _{Aeq} (15min) Contribution						<46
		DLSP Site L _{Amax} (15min) Contribution						<46
21/08/2024	07:20						WD: NW	Traffic 62-75
	(Day)	75	68	66	64	62	WS: 0.1m/s	Birds <60
							Stab: E	DLSP inaudible
		DLSP Site L _{Aeq} (15min) Contribution						<46
		DLSP Site L _{Amax} (15min) Contribution						<46
20/08/2024	21:31						WD: NE	Traffic 40-67
	(Evening)	67	60	56	49	40	WS: 0.5m/s	Insects <40
							Stab: n/a	DLSP inaudible
		DLSP Site L _{Aeq} (15min) Contribution						<39
		DLSP Site L _{Amax} (15min) Contribution						<39
20/08/2024	22:49						WD: W	Traffic 36-72
	(Night)	79	60	56	44	36	WS: 0.5m/s	Train 35-79
							Stab: F	Aircraft 35-48
		DLSP Site L _{Aeq} (15min) Contribution						<35
		DLSP Site L _{Amax} (15min) Contribution						<45

Note 1: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Morning Shoulder - the period from 6am to 7am; Night - the remaining periods.

Note 2: Data from on-site weather station or attended operator observations.

Table 17.3 Annual Compliance Noise Monitoring Report DN-8

Table 7 DN-8 – Operator Attended Noise Monitoring Results								
Date	Time (hrs) ¹	Descriptor (dBA re 20µPa)					Meteorology ²	Description and SPL, dBA
		L _{Amax}	L _{A10}	L _{Aeq}	L _{A90}	L _{Amin}		
22/08/2024	06:27						WD: W	Traffic 52-83
	(Morning	83	64	64	55	52	WS: 0.1m/s	Birds 45-60
	Shoulder)						Stab: G	DLSP inaudible
	DLSP Site L _{Aeq} (15min) Contribution							
	DLSP Site L _{Amax} (15min) Contribution							
21/08/2024	08:25						WD: W	Traffic 44-83
	(Day)	83	68	65	48	44	WS: 0.1m/s	Birds 40-62
							Stab: n/a	DLSP inaudible
	DLSP Site L _{Aeq} (15min) Contribution							
	DLSP Site L _{Amax} (15min) Contribution							
21/08/2024	08:40						WD: W	Traffic 43-87
	(Day)	87	70	66	48	43	WS: 0.5m/s	Birds 40-65
							Stab: n/a	DLSP inaudible
	DLSP Site L _{Aeq} (15min) Contribution							
	DLSP Site L _{Amax} (15min) Contribution							
20/08/2024	21:22						WD: N	Traffic 41-78
	(Evening)	78	53	55	45	41	WS: 0.2m/s	Insects <41
							Stab: n/a	DLSP inaudible
	DLSP Site L _{Aeq} (15min) Contribution							
	DLSP Site L _{Amax} (15min) Contribution							
20/08/2024	23:13						WD: W	Traffic 33-69
	(Night)	69	51	50	37	33	WS: 0.5m/s	Insects 30-35
							Stab: n/a	DLSP inaudible
	DLSP Site L _{Aeq} (15min) Contribution							
	DLSP Site L _{Amax} (15min) Contribution							

Note 1: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Morning Shoulder - the period from 6am to 7am; Night - the remaining periods.

Note 2: Data from on-site weather station or attended operator observations.

4.3.3. Noise Monitoring Long Term Analysis and Assessment

Attended noise readings have typically remained stable or decreased slightly in the last 10+ years as seen in Figure 12 below. Noise monitoring results were generally similar in the current reporting period when compared to previous reporting periods. It is important to note that noise monitoring is within the compliance limits prescribed.

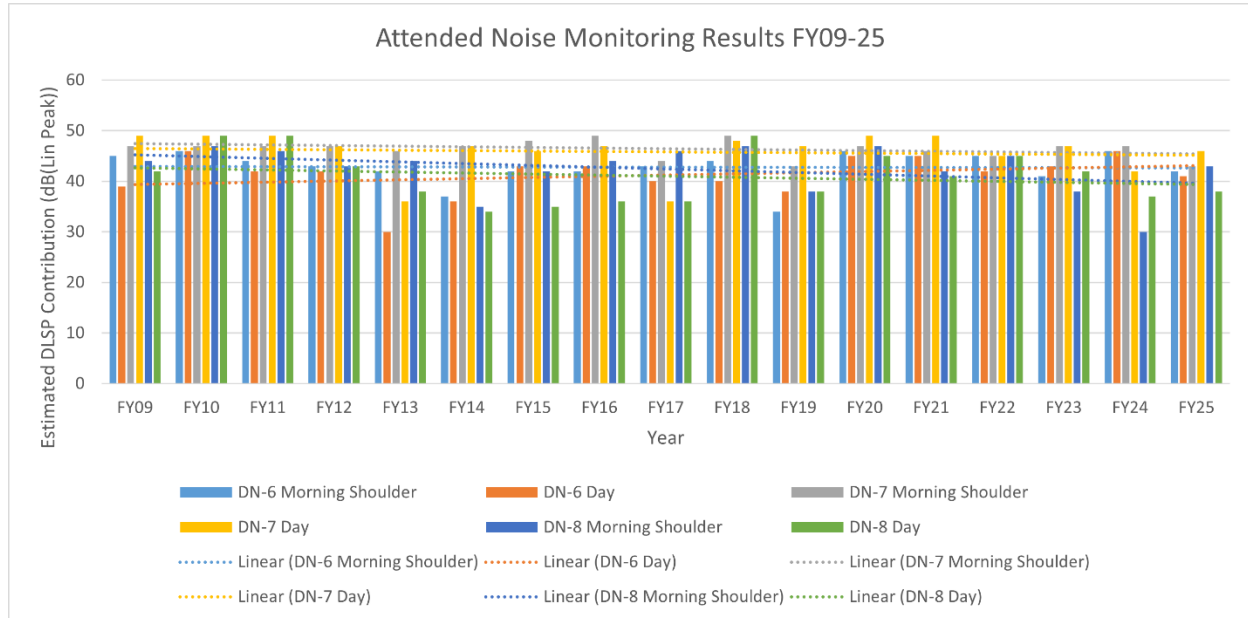


Figure 12 Noise Monitoring Historical Noise Monitoring Trends

4.3.4. Noise Monitoring Summary and Opportunities for Improvement

The noise monitoring results were within compliance limits during the current reporting period.

Immediate access to weather data facilitated by the weather station has allowed the site to improve their processes in reacting to adverse meteorological conditions, which may affect noise impacts on nearby sensitive receptors, such as temperature inversions.

4.4. Surface Water Monitoring

Project related water monitoring locations are shown in shown in Figure 13. Monitoring locations denoted by “*” have a variable location due to dredging operations. Monitoring is undertaken on a monthly basis, consistent with EPL 11147 requirements.

During the reporting period, a previous PRP for Stage 2 pond discharge monitoring was completed and recorded. Licence conditions were updated to include new PRPs for Stage 2 pond monitoring and assessment, inflow and discharge flow methodology, and water quality and flow assessments. Reporting requirements and timelines were amended, with the second report due May 2026 by independent consultant..

Monitoring is also undertaken in the Stage 2 dredge pond during the placement of Potential Acid Sulphide Soils (PASS) for rehabilitation. The required frequency described in condition E1-E11 in EPL 11147 is daily for a period of 30 days for surface waters. Monitoring then reverts back to weekly frequency until PASS is received again. To date, PASS has only been placed in the Stage 2 pond, so this is the only monitoring location that has been activated for this frequency.

Discharge water quality monitoring indicated compliance with the impact criteria at the licenced discharge point of the site at DW16 (EPL9), It was concluded that this was due to flooding and no further action was taken by the EPA. Additionally, monthly monitoring results for the dredge ponds were observed to align with predicted EIS results.

The WQO for most parameters within the dredge ponds were met within the reporting period. Typically, water quality within the operational ponds and discharge points were of better quality than those at upstream locations with the exception of salinity and associated parameters.

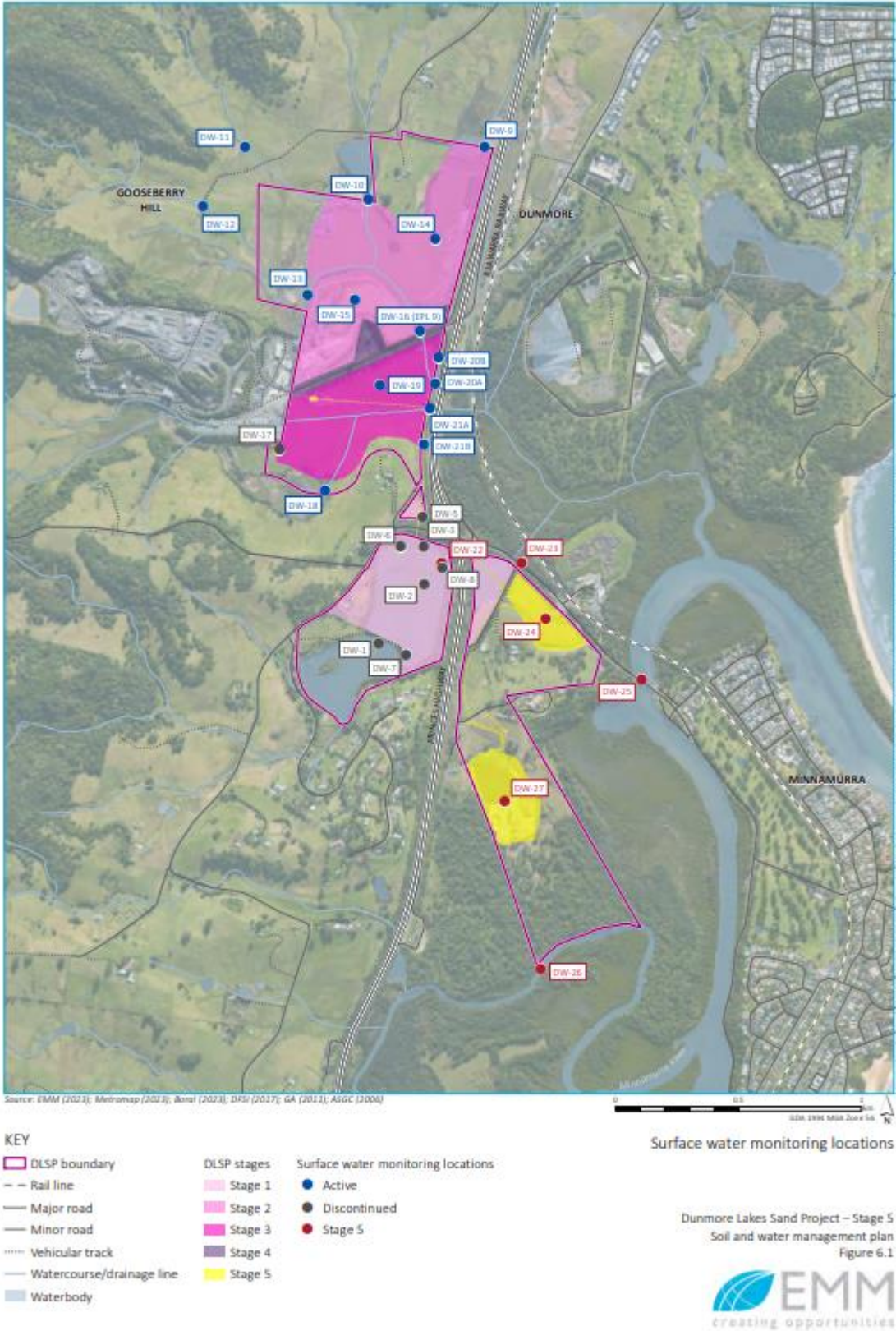


Figure 13 Surface Water Monitoring Locations

4.4.1. Surface Water Quality Impact Criteria

Prior to FY24, 5 EPL water monitoring points were in place.

Discussions with the EPA saw monitoring limited to only 1 EPL location as listed below. This location monitors water discharged from operations.

The other 4 monitoring points were background samples outside of the operations. Boral continues to monitor these locations but no longer as EPL discharge points.

There is 1 compliance monitoring point listed in EPL 11147

- DW 16 (EPL9) – Discharge of waters from Stage 2 pond.

Discharge water quality criteria for DW16 is detailed in S3.C23 of DA-195-8-2004 and is reproduced below in Table 16.

Table 18 Water Discharge Impact Assessment Criteria

Pollutant	Unit of measure	100 Percentile Concentration Limit
Total Suspended Solids	mg/L	50
pH	pH	+/- 1.0

With the commencement of Stage 5B operations, there are two water quality compliance operational monitoring points at DLSP. These are the dredge pond in Stage 5B (DW27) and the Stage 2 Discharge (DW16). The Water Quality Objectives (WQO) associated with the dredge ponds is detailed below in Table 17.

Table 19 Dunmore Lakes Sand Project Water Quality Objectives

Pollutant	Unit of Measure	Water Quality Objective
Turbidity	NTU	5-20
pH	pH	6.5 – 8.5
Salinity	µS/cm	<1,500
Dissolved oxygen	mg/L	>6
Total phosphorus	µg/L	5-50
Total nitrogen	µg/L	100-500
Chlorophyll-a	µg/L	2-10
Faecal coliforms	Median No./100mL	<1000
Enterococci	Median No./100mL	<230
Algae and blue-green algae	No.cells/mL	<15,000
Sodium	mg/L	400
Potassium ion	mg/L	50
Magnesium ion	mg/L	50

Pollutant	Unit of Measure	Water Quality Objective
Chloride ion	mg/L	300
Sulphate ion	mg/L	250
Bicarbonate ion	mg/L	750
Soluble Iron ion	mg/L	6
Ammonium ion	mg/L	20

DPHI has acknowledged that short term exceedances of these objectives may occur during natural events such as heavy rainfall or tidal saline water flow. This notation is important in consideration of the tidal inflow that occurs at the DLSP development, which subsequently impacts the water quality results for the site.

Additional monitoring points are collected as part of the approved Water Management Plan, to provide additional background water quality data for water entering the DLSP operational area and are summarised below:

- DW-9 Upstream of Stage 2 Eastern Tributary
- DW-10 Upstream of Stage 2 Northern Tributary
- DW-11 Background monitoring for Stage 2 tributary – Holcim discharge
- DW-12 Background monitoring for Western Tributary
- DW-13 Background monitoring for Upstream of Stage 2 Western Tributary
- DW-14 Stage 2 Pond
- DW 15a Fines Pond
- DW-18 Rocklow Creek downstream
- DW-19 Stage 3 Pond
- DW-20b Background monitoring for runoff from Stage 2 under the culvert
- DW-21a Background monitoring for the man-made Rocklow Creek channel
- DW-22 Background monitoring for Stage 1
- DW-23 Background monitoring for Rocklow Creek Tributary – Ruth Devenney Reserve
- DW-24 Stage 5A Pond
- DW25 Background monitoring for Minnamurra River upstream of Stage 5
- DW26 Background monitoring for Minnamurra River downstream of Stage 5
- DW27 Stage 5B Pond

4.4.2. Surface Water Monitoring Performance Review

4.4.2.1. Ambient Monthly Monitoring

A summary of the water quality monitoring points is shown below in Table 18. These are average values to reflect the overall compliance for the reporting period.

The dredge pond (DW-27) and discharge point (DW16) are shown in grey. Parameters outside of the water quality objectives for compliance monitoring sites are shown in **red**. Monitoring sites in blue are upstream monitoring locations and are monitored for background purposes only.

Table 20 Surface Monitoring Summary (red denotes an exceedance of the relevant criteria)



Sample ID	pH	Turbidity (NTU)	TSS (mg/L)	Conductivity (µS/cm)	Sulfate (mg/L)	Chloride (mg/L)	Iron (mg/L)	Potassium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Total Phosphorus (mg/L)	Ammonium as N (mg/L)	Bicarbonate Alkalinity (mg/L)	TKN (mg/L)	Total Nitrogen (mg/L)	Dissolved Oxygen (mg/L)	Faecal Coliforms (CFU/100mL)	E.Coli (CFU/100mL)	Enterococci (CFU/100mL)	Total Algae (cells/ml)	Blue Green Algae (cells/ml)	Chlorophyll-a (µg/L)
DW9	7.77	17.05	13.60	479.50	32.12	68.12	0.92	3.62	13.25	55.80	0.23	0.06	90.80	0.93	1.14	5.48	2,391	2,584	1,006	49,066	12,223	41,525
DW10	6.77	36.87	38.75	416.80	10.27	68.52	2.32	4.51	11.71	45.08	0.34	0.04	69.90		1.44	4.91	25,966	1,152	1,983	12,439	1,614	9,397
DW11	7.72	10.43	28.00	941.33																		
DW12																						
DW13	7.44	177.94	83.40	633.87	24.75	67.08	4.43	3.55	16.62	84.68	0.73	0.11	195.00		1.06	3.90	1,482	1,903	161	5,364	1,229	4,642
DW14	7.72	18.84	10.50	564.44	75.20	46.08	0.90	3.45	17.29	63.80	0.12	0.03	126.40	0.54	0.89	5.39	37	15	70	16,984	4,472	15,847
DW15a	7.85	97.36	50.24	551.16	58.00	42.92	3.53	5.51	13.43	47.44	0.22	0.10	161.20	0.79	1.02	5.67	380	243	462	65,330	42,916	16,618
DW16 EPL9	7.65	14.66	26.65	605.93																		
DW18	7.31	48.43	48.08	498.58																		
DW19	7.81	9.62	8.00	464.16	41.72	42.72	0.78	5.18	11.57	46.36	0.12	0.03	123.00	0.57	0.93	4.77	41	41	68	8,187	2,359	15,237
DW20b	7.77	18.06	16.11	538.31																		
DW21a	7.49	9.64	8.78	5,766.63																		
DW22	7.17	5.98	7.00	200.50	10.25	22.50	0.65	3.25	3.25	16.00	0.05	0.11	36.75	0.83	0.85		5,540	123	109	31,115	40,663	6
DW23	7.13	5.00	14.00	18,840	787.75	5,832.50	0.66	137.75	436.25	3,609	0.21	0.24	116.50	1.93	1.98		170	134	814	142,960	17,730	15
DW24	7.57	12.78	8.00	689.50	44.50	143.00	0.74	5.50	15.25	100.50	0.04	0.15	86.25	0.90	0.93		365	60	35	59,023	63,750	3
DW25	7.58	4.10	20.00	40,075	2,024	12,703	0.17	297.75	978.50	8,073	0.23	0.12	108.75	0.48	0.53		2,512	2,511	880	1,281	503	3
DW26	7.21	13.95	46.00	15,314	675.75	4,774.25	0.34	104.25	329.50	2,726	0.57	0.13	82.00	0.70	0.80		5,836	4,568	3,023	2,735	5,550	3
DW27	7.94	12.65	6.50	464.75	36.25	41.75	0.53	5.00	10.50	41.75	0.41	0.03	139.00	1.18	1.20		33	25	20	73,616	85,938	1,176

Stage 2 and Stage 3 ponds (DW-14 and DW-19 sampling points respectively) are no longer operational dredge ponds however the Water Quality Objectives are still applied as part of ongoing water management of the site.

There was only one active dredge pond (Stage 5B) monitoring site (DW27) within the reporting period.

Upstream drainage channels (DW-9, DW- 10, DW-11, DW-12, and DW-13) are ephemeral and are generally impacted by upstream agriculture land uses with cattle grazing often observed in the immediate vicinity of monitoring locations. These streams flow directly into the Stage 2 dredge pond and subsequently impact the ponds water quality.

Upstream monitoring points are located away from the tidal zone at Rocklow Creek and are typically fed by springs and run-off following rainfall events. Typically, water quality within operational ponds and discharge points are of higher quality than the upstream conditions.

As recommended during the EIS process, water quality monitoring of the Stage 3 pond area has continued in order to determine if there are any long-term salinity issues arising. The concern related to the dredge ponds intersecting with saline tidal groundwater aquifers which could result in surface water quality deterioration and potential risk to rehabilitation sustainability.

Data from the previous reports exhibits that Stage 3 has not caused a direct linkage with saline groundwater and that salinity levels have tended to vary in accordance with prevailing climatic conditions.

4.4.2.2. Discharge Water Quality Monitoring

Discharge water quality monitoring undertaken during the reporting period was within limits prescribed in condition S3.C23 of the consent during all instances of sampling. A breakdown of discharge water quality monitoring results at DW16 is summarised below in Table 19.

Table 21 Discharge Surface Water Monitoring Results

Date	pH [6.6 – 8.6]	TSS (mg/L) [<50 mg/L]
31/03/2025	8.07	15
01/04/2025	8.28	15
02/04/2025	8.11	11
03/04/2025	8.24	<5
26/05/2025	7.92	23
27/05/2025	8.15	14
28/05/2025	7.97	14
29/05/2025	8.15	10
05/06/2025	8.08	8

Two discharge events throughout the reporting period triggered Special Frequency 1 water monitoring to be undertaken as per EPL 11147. Special Frequency 1 requires sampling to be undertaken daily during discharge for the first 5 days, then weekly until a 200mm freeboard is achieved. These events were:

- 28-31 March 2025: 137 mm.
- 21-25 May 2025: 176.6 mm.

4.4.2.3. Water Monitoring after Placement of PASS

Special Frequency 2 water monitoring is required in ponds where Potential Acid Sulphate Soils (PASS) has been placed as per E1.8 note of EPL 11147. Special Frequency 2 is required to be conducted daily during the PASS placement into water and thereafter daily during operational hours for a period of one month from the date the last load of PASS was placed under water. The pH of the water must be monitored weekly at all other times.

During the reporting period, PASS was placed in the Stage 2 pond DW 14 (placement commenced 26 June 2018). No PASS has been placed in Stage 3 or Fines Pond 2 DW15a.

PASS material is typically received in “campaigns” and there were three periods where PASS importation had ceased for 30 days and monitoring reverted back to the weekly sampling regime.

Campaigns for FY25 were as follows:

- 15 July - 5 September 2024;
- 19 January – 26 March 2025;
- 5 May – 8 May 2025;

A summary of the water quality monitoring after placement of PASS in the Stage 2 dredge pond is shown below in Figure 14 and 15.

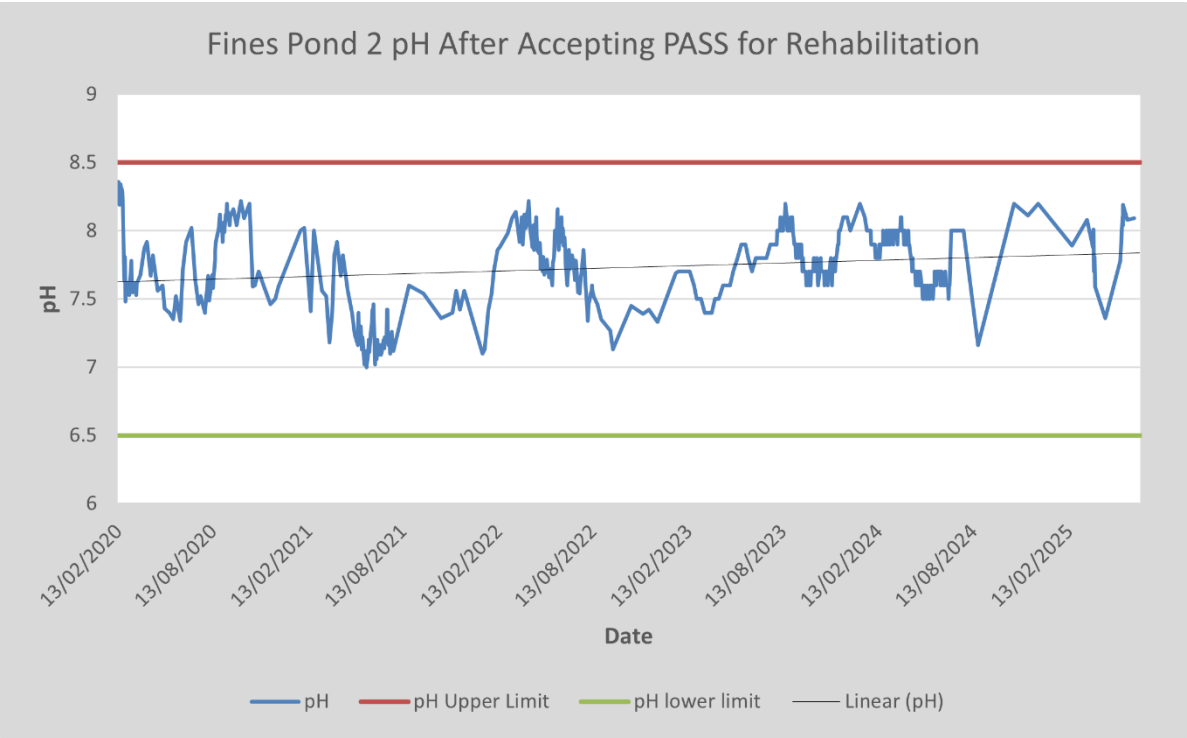


Figure 14 Stage 2 Pond pH After Accepting PASS

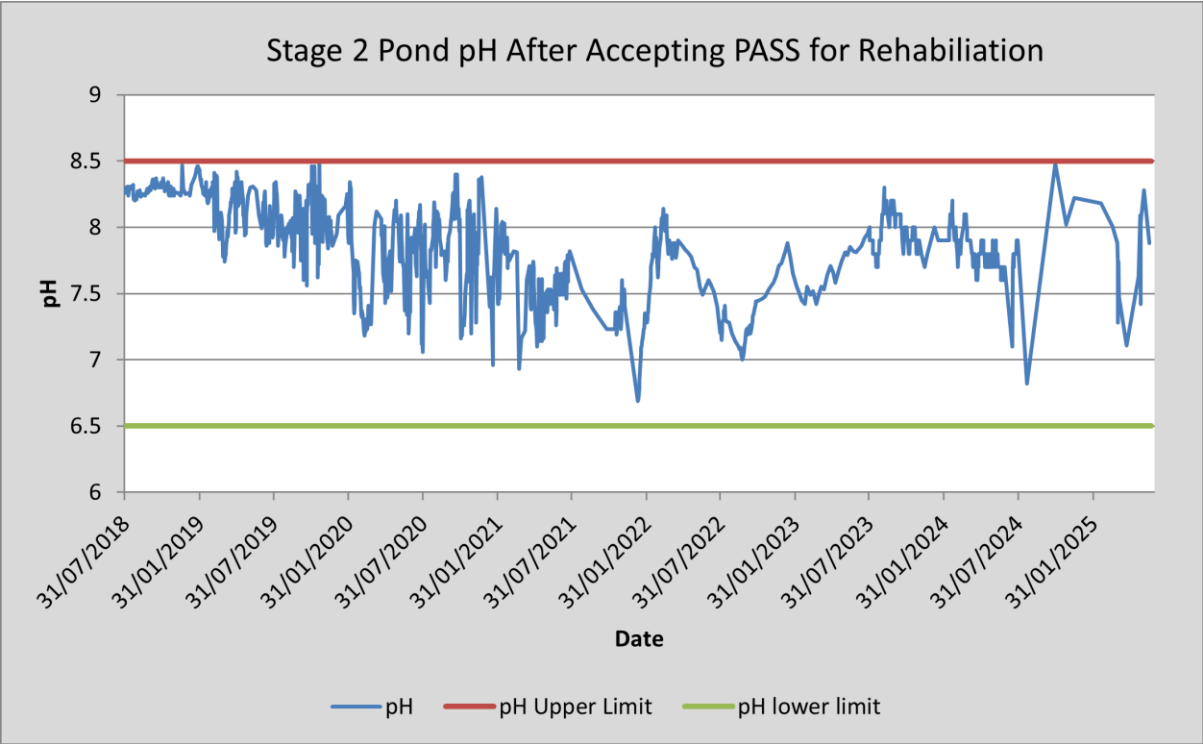


Figure 15 Fines Pond 2 After Accepting PASS for Rehabilitation

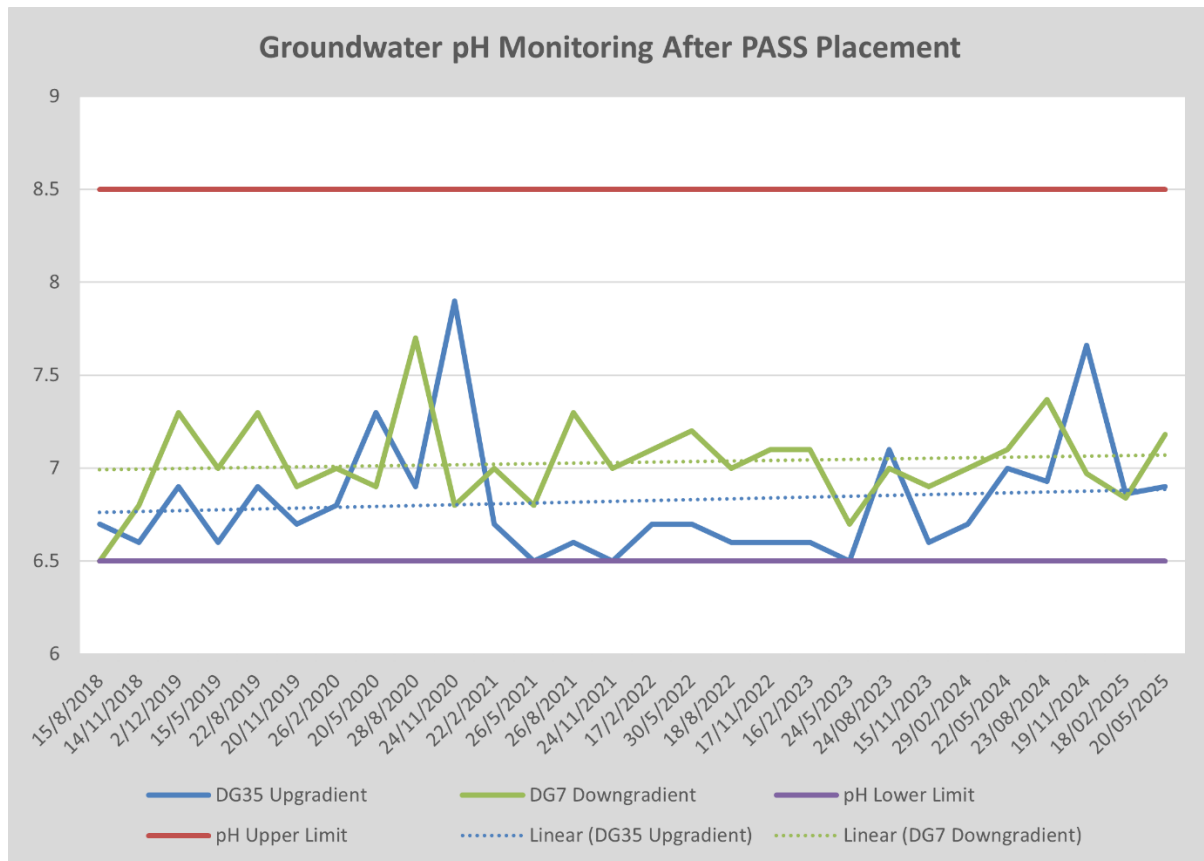


Figure 16 Groundwater pH After Accepting PASS for Rehabilitation

4.4.2.4. Pollution Reduction Program

In June 2023, DSS commenced a Pollution Reduction Program (PRP) to monitor the discharge of waters from Stage 2 through the Ruth Devenney Reserve in accordance with U1.1-U1.5 of EPL11147. A broad suite of analytes was collected during discharge events, and the EPA was notified of all of the results. Data was collected for one year and the EPA was provided a full report on the FY24 PRP requirements in August 2024.

Following this report the EPA noted guidelines for *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZG 2018) would be more suitable for analysis. The EPA implemented an additional PRP in February 2025 which included updated analytes and potential for improved flow methodology. Updated analytes and methodology as follows:

The following variations have been made to the licence:

Condition U1 conditioning a PRP titled "Monitoring and assessment of discharge to waters - Stage 2 pond" has been marked complete and added to the Completed Programs table at Condition G.1; Condition U1 has been amended to include a new PRP titled "Stage 2 Pond Monitoring and assessment of discharge to waters"; Condition U2 conditioning a PRP titled "Inflow and discharge flow monitoring methodology" has been added to the Licence; Condition U3 conditioning a PRP titled "Water quality and flow assessments" has been added to the Licence.

Condition U1

- no longer includes water monitoring results for water sampling conducted at points of inflow; and
- has a due date of 15 months from issue of variation of licence

Condition U2:

- require the development of methodologies to monitor the inflows to the Stage 2 pond, water
- discharges from the Stage 2 pond and freeboard levels within the Stage 2 pond by 2 June 2025;
- require the provision of a written report to the EPA outlining these methodologies and the dates these methodologies will be installed and monitoring commenced by 2 June 2025;
- require water flow monitoring at points of inflow to the Stage 2 pond, discharge from the Stage 2
- pond and monitoring of freeboard levels in the Stage 2 pond, over a period to be agreed with the EPA
- require water quality monitoring at points of inflow over a period to be agreed with the EPA;
- include Notes relating to rainfall levels, acknowledging that the required monitoring is to aid in the assessment of potential sources of elevated metals in the Stage 2 pond and in the preparation of a written report required by Condition U3 and acknowledging the Licensee may require a Controlled Activity Approval

Several updates have been required to EPA during the reporting period for both monitoring and methodology. These were completed in June 2025 with additional updates due in September 2025 and the final report due in May 2026.



Building
something
great

4.4.3. Historical Surface Water Monitoring Long Term Assessment and Analysis

Graphs of Water Quality over time can be seen below in Figure 17 to Figure 20.

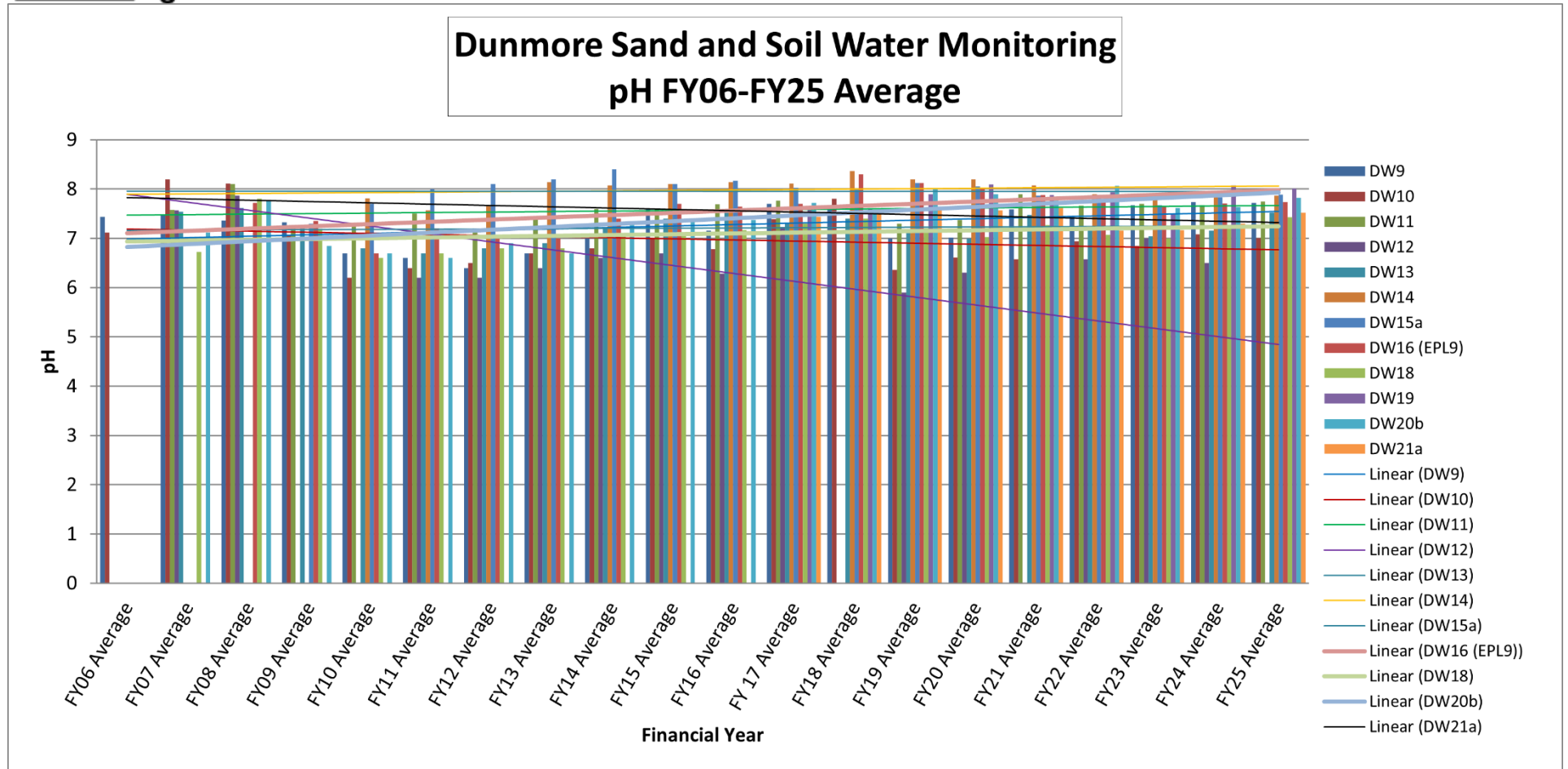


Figure 17 Surface Water pH Historical Monitoring Trends

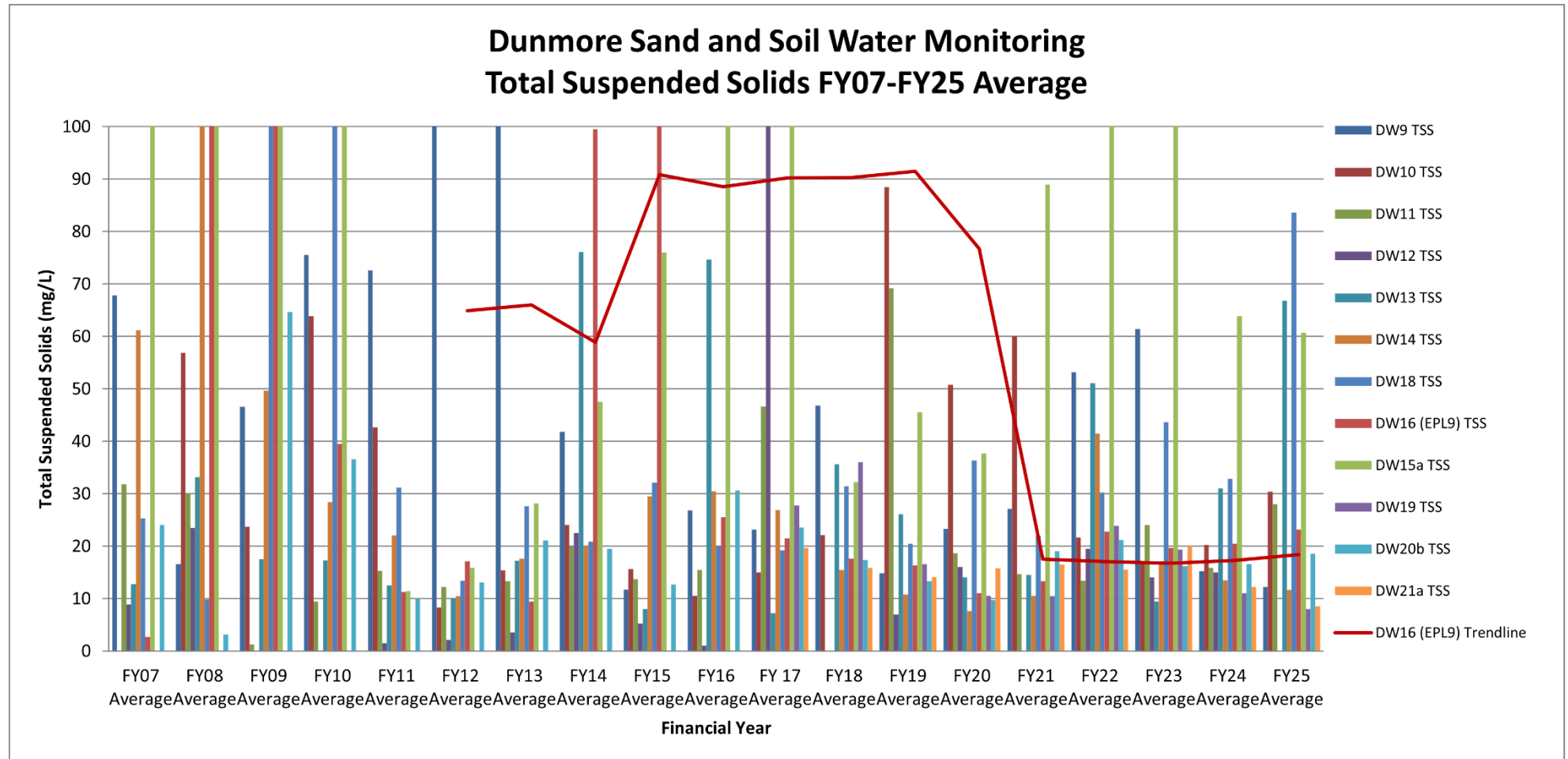


Figure 18 Surface Water TSS Historical Monitoring Trends

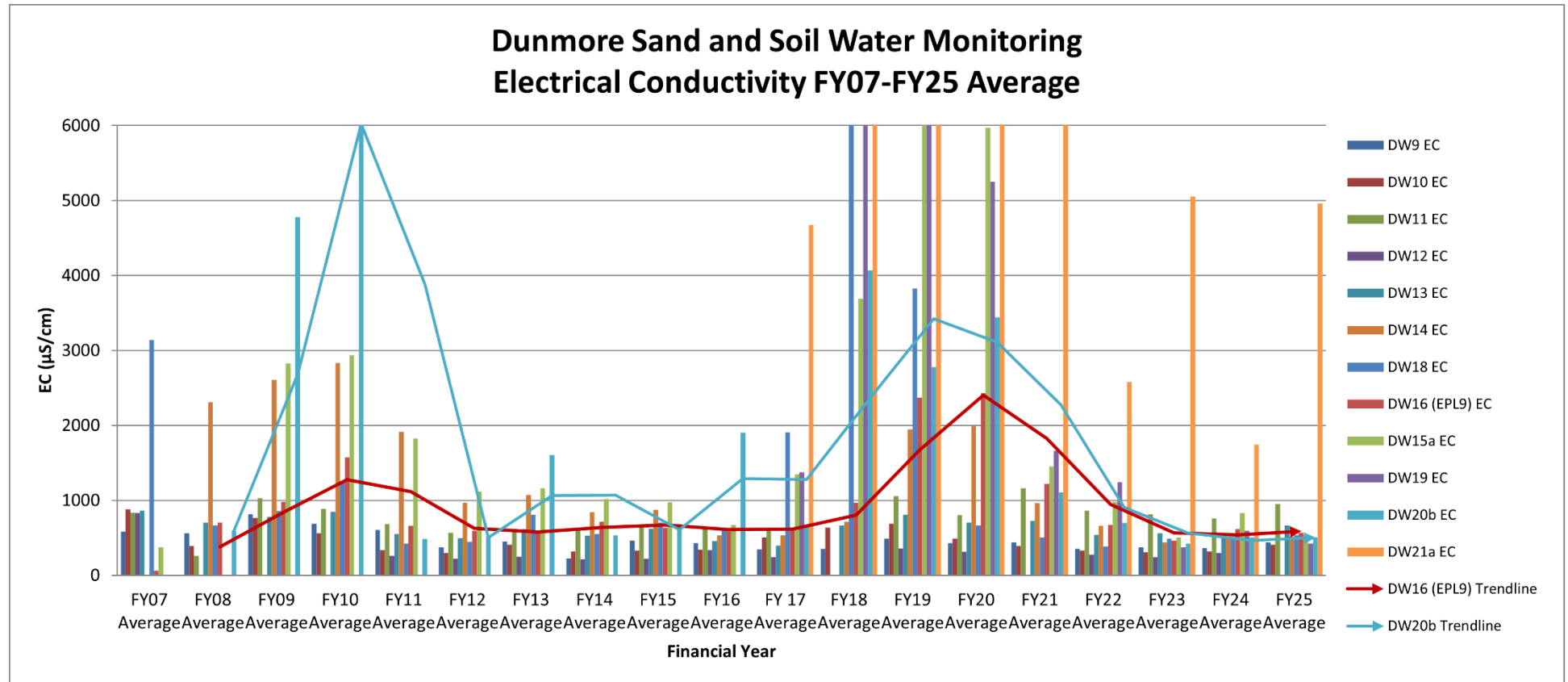


Figure 19 Surface Water Conductivity Historical Monitoring Trends

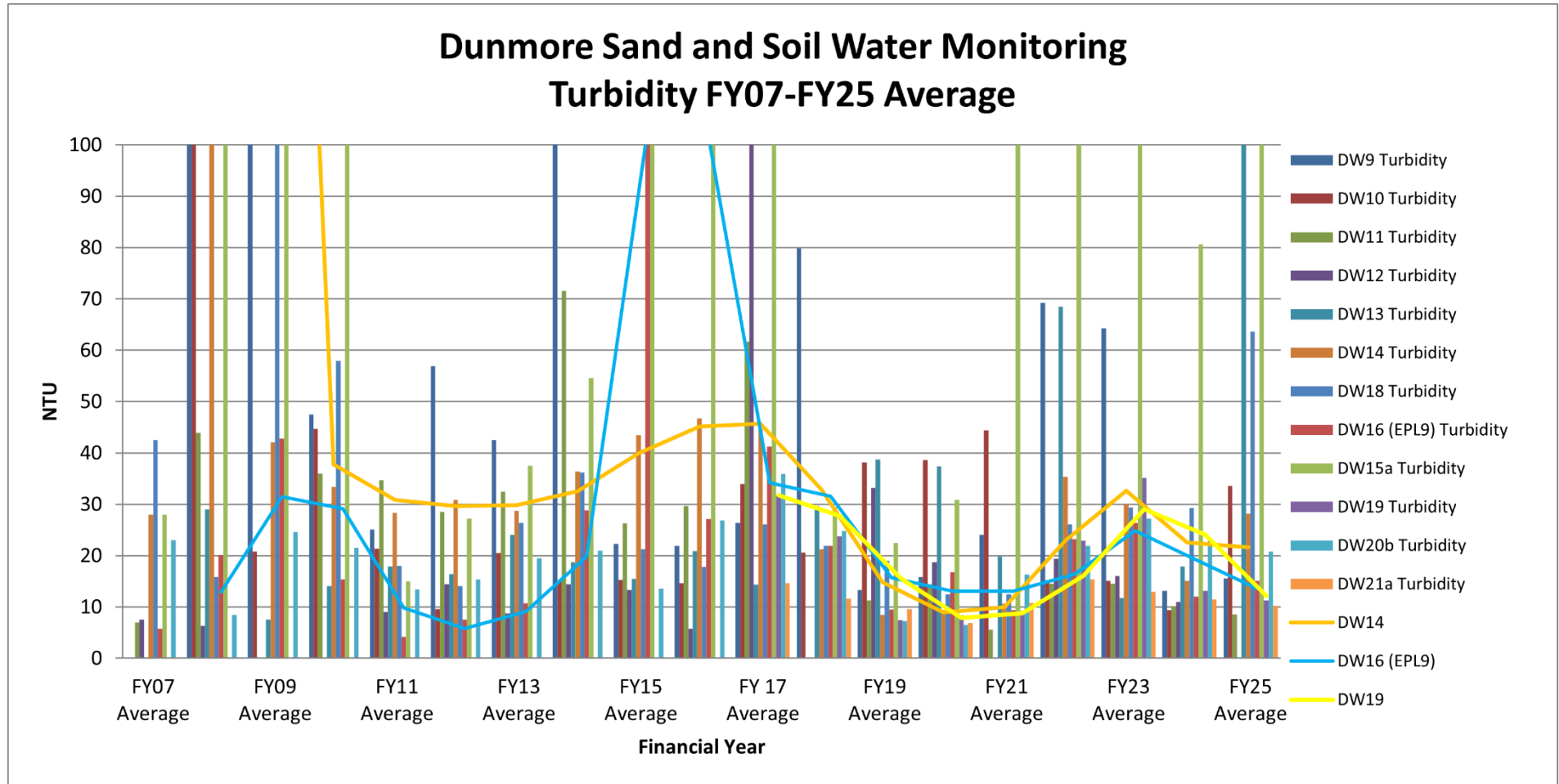


Figure 20 Surface Water Turbidity Monitoring Historical Trends



The following general trends can be observed from the above data:

- Typically, upstream (DW9 to DW12) pH, DO and conductivity is comparable to the compliance monitoring location (DW16/EPL9), which aligns with observations that upstream drainage channels are ephemeral and generally only flow during periods of rainfall. These upstream sites are also impacted by upstream agriculture with cattle grazing.
- Upstream turbidity, TSS faecal coliforms and enterococci are higher at the upstream monitoring locations when compared to the compliance monitoring location due to the impacts of cattle grazing and defecation. These inputs also contribute to increased nitrogen in the upstream water flows. The operational dredge ponds typically have lower turbidity than upstream conditions during floods, whereby the dredge ponds act as large settling basins, which allow a reduction in turbidity and sediment load downstream of the ponds during periods of high rainfall.
- Typically, the fines pond has a higher turbidity and TSS than the dredge pond, which is to be expected due to its function. The fines pond is kept offline and protected by a 3.7m AHD bund designed for protection in the event of a 1 in 100-year flood event.
- Salinity is generally higher in the southern sections of Stage 3 (DW-19) and Rocklow Creek (DW21a), which is located in close proximity to the tidal zone at Rocklow Creek. This is a predicted outcome from the EIS based on the natural conditions of the site and is discussed below.

Initial investigations from the original DLSP EIS commissioned by R.W Corkery described that the groundwater within the southern section of Stage 3 contains slightly brackish water (TDS >2,500), which corresponds to a salinity far greater than the 1,500 μ S/cm threshold described in the WQO detailed in condition S3.C24 of the consent. As the dredging progresses south in Stage 3 near Rocklow Creek, the infiltration of this tidal brackish water into the Stage 3 dredge pond will be unavoidable and is to be expected based on the natural conditions present in Stage 3.

The department acknowledges in condition S3.C24 of the consent, as per the note, that short term exceedance of the WQO may occur due to natural events such as tidal saline inflow, such as those identified in the south of Stage 3.



4.4.4. Surface Water Monitoring Summary and Opportunity for Improvements

Monitoring will continue for all water quality parameters in the next reporting period. Backfilling of Stage 5A is ongoing, which will allow the site to move toward its final landform in accordance with the progressive rehabilitation requirements.

The recommendations of the previous and additional PRP's will be implemented.

4.5. Water Balance

Water extracted from the DLSP ponds is measured and considered in relation to the applicable groundwater licence. Water is used for dust suppression and sand processing and is sourced from the fines pond and dredge pond under a groundwater Water Access Licence (WAL24477) issued under the *Water Management Act 2000*. The licence permits the groundwater take of 77ML of water from the Sydney Basin South Groundwater Source.

4.5.1. Surface Water Flows

Surface runoff from three upstream catchments is generally captured in farm dams and bunding around the Stage 2 area. High flow events and floodwaters however enter Stage 2 and ultimately flow into the Stage 3 area. The main channel of Rocklow Creek has been diverted around the Stage 3 area which is joined by controlled discharge waters from the Stage 3 pond spillway. The system allows for the return of environmental flows into the Rocklow Creek catchment below the site. During flood events, sand extraction ceases. During the reporting period, flooding occurred a number of times. Inflows are assumed to be the same as outflows during overflow events. The influence of surface water on the site water balance is therefore considered to be neutral.

4.5.2. Water Use for Dust Suppression

Water contained within the extraction ponds is used for all raw water demand, including processing and dust control. A 30,000 L water cart operates on site on all operational days when there is no precipitation to reduce dust from unsealed roads, particularly the roads used by trucks delivering VENM. During the reporting period, the number of rain-days decreased from 134 to 85 which increased the volume used for dust suppression to approximately 22.43ML.

4.5.3. Water Use from Production

- Water is extracted with the sand during dredging operations, with additional water added to this during processing.
- Pumping rates and volumes of added water is shown in Table 20.
- The extracted water returns via overland flow to the fines return pond (i.e. flows back into the system) so is excluded from the water balance calculations and reported for information only.

Table 22 Dredge and Spray Pump Rates

Processing Steps	Pumping Rate (L/s)	Water Required (ML/8hr day)
Dredge pump (combined water and sand)	250	7.2
Pump to sand wash bin for dust washing	150	4.33
Pump for oversize screen sprayers	50	1.47
Total	N/A	12.96
This 12.96 ML is returned to the Stage 3 pond via the fines return pond and is therefore excluded from the water balance calculation.		

- However, some residual water is exported from the site along with the sold sand product (approximately 8% of exported sand product by weight is water).
- Current reporting period sales was 206,844 tonnes.
- Water loss from sand sales is calculated as 16.55 ML.

Total water use is therefore calculated as water use for dust suppression (22.43ML) plus water loss from sand production (16.55ML).

The calculated total water use volume is 38.98ML, which is within the volumes of groundwater take of WAL24477 of 77ML/year.

4.6. Flood Storage Capacity

The site is located at the confluence of three tributaries of the Minnamurra River. Given the proximity of groundwater to the surface there is potential for flooding. Water backing up along Rocklow Creek from the Minnamurra River is also a major contributor to on-site flooding.

4.6.1. Stages 2-4:

The EIS noted that the RTA designed and constructed the North Kiama by-pass to “match the openings of the downstream railway embankment which was designed and constructed following a flood study completed by Webb McKeown (1989) – predicting a 100-year average recurrence interval (ARI) flood level of up to 3.3m on Rocklow Creek”. The EMP went on to state that: “The culvert system would, therefore, not impact on local flooding regimes, which based on previous flood studies of Rocklow Creek, (including Webb McKeown 1989), are considered to approximate the following:

- 100 year Average Recurrence Interval (ARI): 3.6m AHD
- 20 year Average Recurrence Interval (ARI): 3.3m AHD
- 10 year Average Recurrence Interval (ARI): 3.2m AHD.

To protect the site from floods, up to and including the 1 in 100-year event, the processing and stockpile area have been constructed above 3.6m AHD and site bunds are generally at 3.7 metres AHD. The fines pond is bunded to a minimum 3.7m AHD as shown in the surveyed points in Figure 21 below.

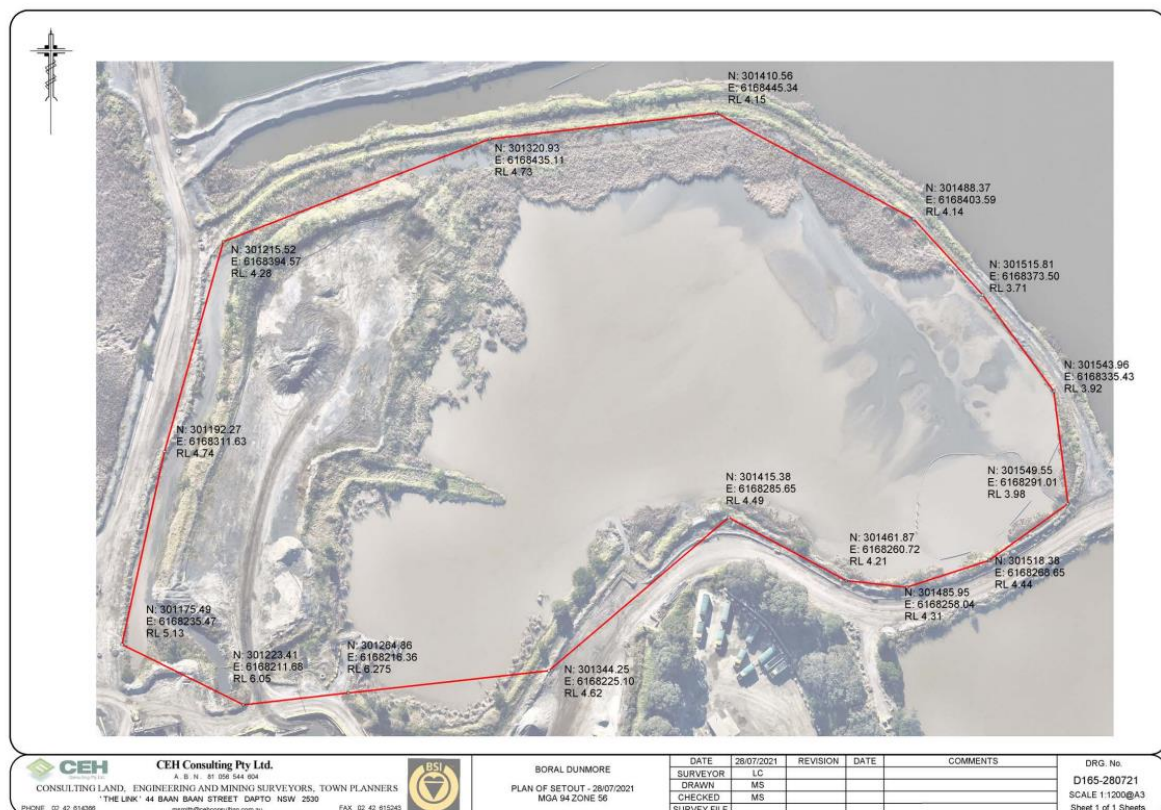


Figure 21 Surveyed Fines Pond Bund

The majority of the access road off Tabbita Road is also above 3.6 metres AHD; however, the ramp abutting Tabbita Road was constructed by RMS below 3.6 metres AHD due to the presence of overhead powerlines and potential safety risks to heavy vehicles.

Condition S3.C27 of the consent requires that the flood storage capacity of the site is no less than the pre-existing flood storage capacity at all stages of the development, unless otherwise approved in writing by the Planning Secretary. Total historic extraction volumes within both Stage 2 and Stage 3 area are significantly higher than total backfilling volumes to date which has created an overall increase in flood storage capacity. During the reporting period, extraction continues at Stage 5 area while backfilling continued in Stage 2 and 3 which will result in a gradual reduction in flood capacity. However, the final site rehabilitation plan includes unfilled pond area and freshwater wetlands which provide an overall increase in flood retention capacity compared to the pre-mining floodplain.

4.6.2. Stage 5:

A surface water assessment was undertaken for Modification 2 of the Dunmore Lakes Sand Project, which outlined the flood potential of Stage 5. As such, the Stage 5B extraction area is subject to inundation due to backwater flooding from the Minnamurra River. Note that Stage 5B cannot discharge. Flood inundation of Stage 5B is relatively shallow, with depths across most of the extraction area ranging from 0.1 to 0.2m for a flood event of 1% AEP magnitude. The majority of Stage 5B remains flood free in smaller more frequent flood events. The PMF event is predicted to inundate the entire Stage 5B area with flood depths of approximately 1m AHD across most of the extraction area. In accordance with the aforementioned surface water assessment, the PMF level is 5.15m AHD.

A flood bund was designed and built around the extraction footprint of Stage 5B at 5.5m AHD to satisfy the requirement for adequate flood mitigation. The Flood Bund Design is shown below in Figure 22.

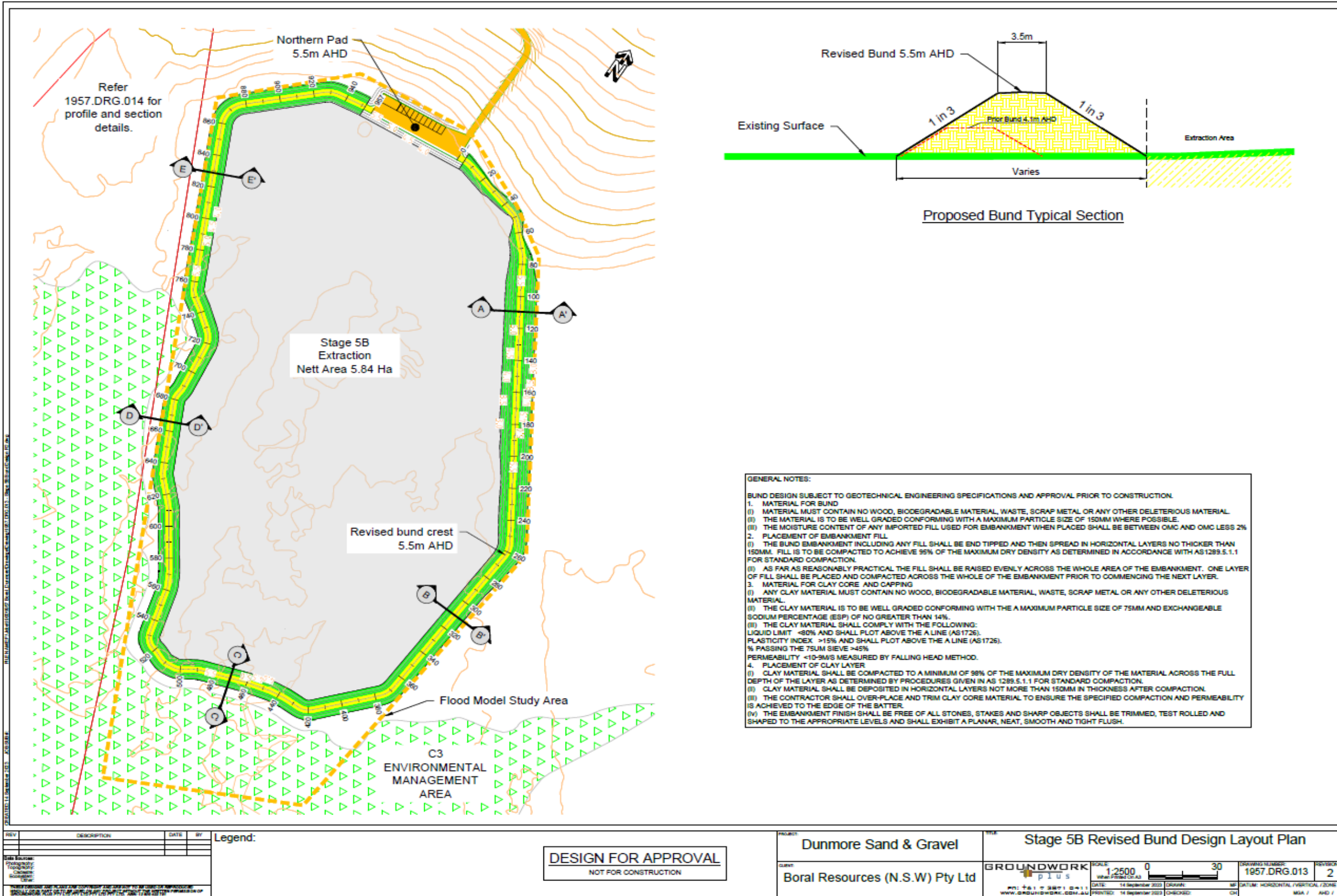


Figure 22 Stage 5B Flood Bund Design



4.7. Groundwater Monitoring

Trace Environmental were commissioned to prepare the Groundwater Monitoring Report for 2024-2025 and is publicly available on our website.

The conclusions of the 2024-2025 report are as follows:

- Fluctuations in the groundwater levels are likely related to rainfall recharge with some minor tidal influence also observed; and
- Decreases in groundwater levels typically correlate with periods of low rainfall, resulting in low recharge as the aquifer drains to Rocklow Creek and Minnamurra River to the South-East. However, overall decreases in groundwater level were observed in monitoring wells MWB2s and MWB2d, which may be a result of the proximity of these wells to dredging activities in this portion of the site.

Based on the above, it is concluded that fluctuations in water table levels are naturally occurring and are not caused by dredging activities at the site, except at the immediate vicinity of dredging activities at the Stage 5 portion of the site.

4.7.1. Groundwater Monitoring Impact Assessment Criteria

EES have devised site specific trigger values, derived from monitoring the aquifer in Stage 2 and Stage 3 since 2003 and prior to the commencement of operations in Stage 2 and 3. These site-specific trigger values have been adopted in the approved Water Management Plan and are reproduced below in Table 23.

Table 23 Groundwater Impact Assessment Criteria

Analyte	Units	Trigger Value		
		DA Criteria	Western bores ¹	Eastern bores ²
pH	-	6.5-8.5	6.5-8.5	6.5-8.5
Electrical Conductivity (EC)	µS/cm	<1,500	1,500	33,000
Phosphorous (PO ₄) ³	µg/L	5-50 ³	4.0	0.7
Total Nitrogen	µg/L	100-500	-	-
Sodium (Na)	mg/L	400	560	5,500
Potassium (K)	mg/L	50	50	170
Magnesium (Mg)	mg/L	50	90	420
Chloride (Cl)	mg/L	300	1,400	6,900
Sulfate (SO ₄)	mg/L	250	300	1,170
Bicarbonate (HCO ₃)	mg/L	750	400	420
Dissolved Iron (Fe)	mg/L	6	3.0	4.0
Ammonium (NH ₄)	mg/L	20	1.0	3.0

Notes:

1. Western bores: BHA to BHF; DG17, DG21, DG31, DG36, DG59, DG60 are those located west of the Princes Highway
2. Eastern bores: DG1 to DG7 are those generally located east of the Princes Highway
3. Note value is for total phosphorous not phosphate (multiply by 3.06 when reported as phosphorus)

The location of the groundwater monitoring points and groundwater flow direction for Stages 2-4 is shown in Figure 23. Stage 5 flow direction is shown in figure 24.

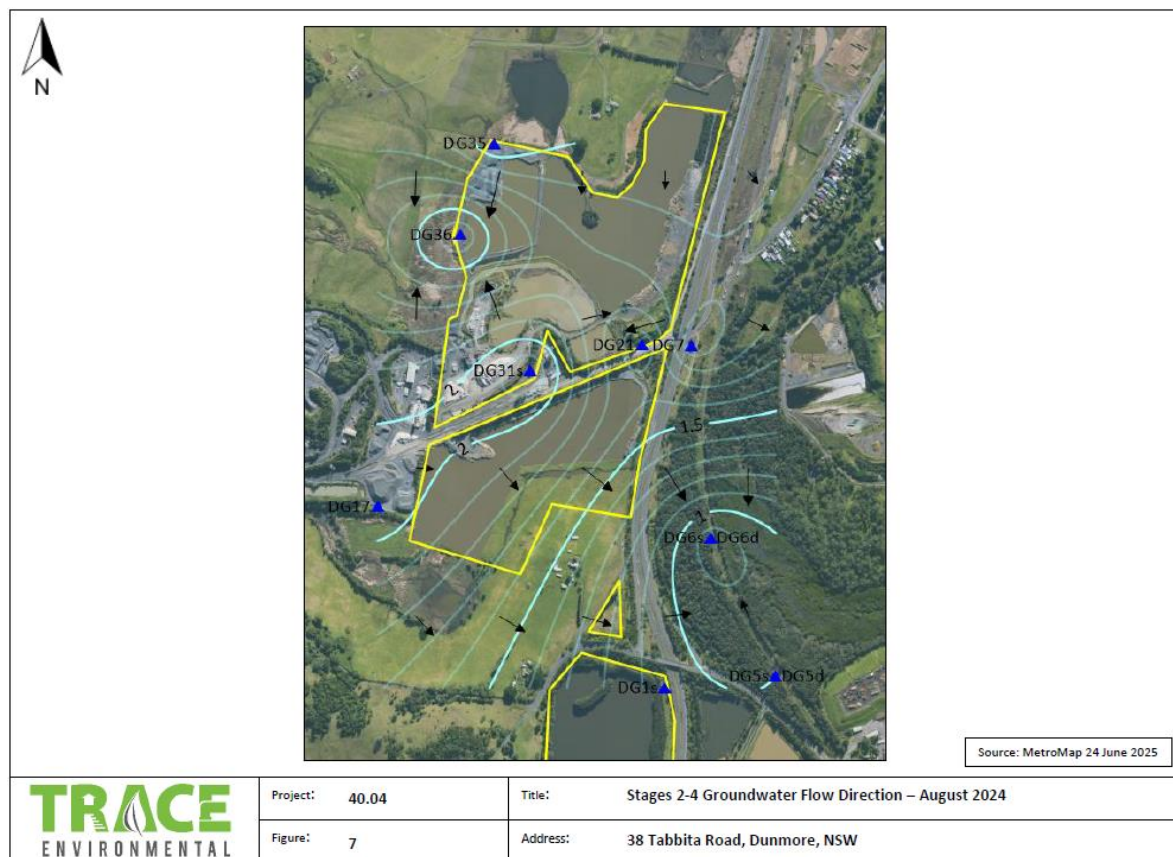


Figure 23 Groundwater Monitoring Locations and Derived Flow Stage 1-4

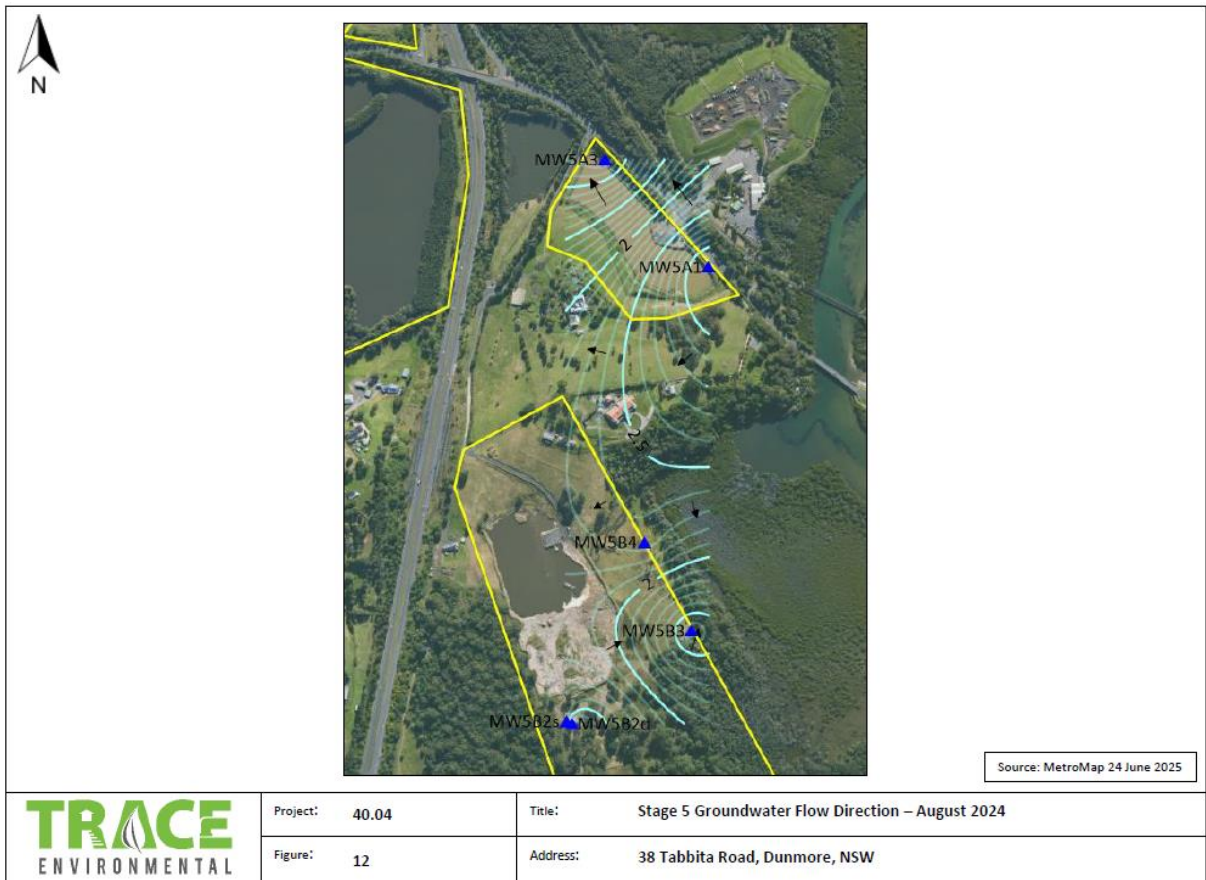


Figure 234 Groundwater Monitoring Locations and Derived Flow Stage 5

4.7.2. Groundwater Monitoring Current Reporting Period Performance Review

A summary of the groundwater quality data for monitoring bores located west and east of the highway is shown Table 22 and Table 23, respectively.

Elevated sodium and chloride concentrations in monitoring wells DG5d, DG6s, DG6d and DG7 indicate a saline influence, consistent with the historical tidal influence observed in these wells located in the eastern portion of Stages 2-4;

- The ion profiles are relatively stable across the four GMEs, indicating a well-buffered chemically equilibrant groundwater system, supported also by the relatively high concentrations of bicarbonate (as CaCO₃) observed in the majority of groundwater samples; and
- No significant seasonal trend is evident across the four GMEs.

Table 24 Groundwater Monitoring Summary West of Princes Highway

Sample ID					DG1s				DG17				DG21				DG31s			
Month					Aug-24	Nov-24	Feb-25	May-25	Aug-24	Nov-24	Feb-25	May-25	Aug-24	Nov-24	Feb-25	May-25	Aug-24	Nov-24	Feb-25	May-25
Sample Date					29/08/2025	19/11/2025	18/02/2025	20/05/2025	29/08/2025	19/11/2025	18/02/2025	20/05/2025	29/08/2025	19/11/2025	18/02/2025	20/05/2025	29/08/2025	19/11/2025	18/02/2025	20/05/2025
Analyte	Units	Development Consent Trigger Values ¹	GMMP Trigger Values ²	LOR																
pH	-	6.5 - 8.5	6.5 - 8.5	-	7.65 ^A	7.26	7.34	7.44	7.02 ^A	8.38	7.46	6.93	6.71 ^A	6.67	6.57	7.09	7.02 ^A	6.72	6.68	7.1
Electrical Conductivity (EC)	µS/cm	>1500	33,000	-	505 ^A	514	544	564	277 ^A	244	2190	2050	932 ^A	895	946	898	487 ^A	985	774	621
Total Dissolved Solids (TDS)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen (DO)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oxydation-Reduction Potential (Redox)	mV	-	-	-	51 ^A	129	23	49	18 ^A	77	45	299	54 ^A	56	-31	109	-1 ^A	5	-44	47
Hydroxide Alkalinity as CaCO ₃	mg/L	-	-	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO ₃	mg/L	-	-	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO ₃	mg/L	750	400	1	208	197	240	232	936	796	802	621	273	217	133	126	127	170	169	141
Total Alkalinity as CaCO ₃	mg/L	-	-	1	208	197	240	232	936	796	802	621	273	217	133	126	127	170	169	141
Sulfate as SO ₄	mg/L	250	300	1	<10	<1	<1	<1	<10	<1	<1	69	43	42	89	80	111	312	200	163
Chloride (Cl)	mg/L	300	6,900	1	42	47	49	44	449	470	381	303	143	170	206	184	21	51	34	26
Calcium (Ca)	mg/L	-	-	1	65	60	70	80	100	85	88	112	52	33	21	21	72	131	99	93
Magnesium (Mg)	mg/L	50	420	1	9	10	11	11	117	101	94	81	19	21	14	15	10	34	19	17
Sodium (Na)	mg/L	400	5,500	1	43	43	40	42	390	334	303	257	156	150	171	162	31	61	44	32
Potassium (K)	mg/L	50	170	1	2	2	2	2	36	34	32	28	1	2	2	2	2	4	3	3
Iron (Fe)	mg/L	6	4	0.05	2.14	2.27	2.59	3.43	1.98	2.89	1.03	1.23	1.00	0.87	0.85	1.00	1.30	1.48	1.11	1.07
Fluoride (F)	mg/L	-	-	0.1	0.3	0.2	-	-	0.8	0.7	-	-	0.2	0.2	-	-	0.1	0.1	-	-
Ammonium as N	mg/L	-	-	0.01	0.73	0.89	-	0.82	0.96	1.10	-	0.84	0.36	0.49	-	0.55	0.06	0.35	-	0.19
Ammonia as N	mg/L	20	1	0.01	0.74	0.90	0.92	0.83	0.96	1.19	0.92	0.84	0.36	0.49	0.53	0.55	0.06	0.35	0.31	0.19
Nitrite as N	mg/L	-	-	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nitrate as N	mg/L	-	-	0.01	<0.01	0.01	<0.01	<0.01	0.03	0.02	<0.01	<0.01	<0.01	<0.01	0.01	0.03	1.02	<0.01	0.01	0.01
Nitrite + Nitrate as N	mg/L	-	-	0.01	<0.01	0.01	<0.01	<0.01	0.03	0.02	<0.01	0.01	<0.01	<0.01	0.01	0.03	1.02	<0.01	0.01	0.01
Total Kjeldahl Nitrogen as N	mg/L	-	-	0.1	1.4	1.3	1.6	1.4	1.8	1.7	1.6	1.5	1.5	1.3	1.0	1.0	0.5	0.7	0.8	0.6
Total Nitrogen as N	mg/L	0.1 - 0.5	-	0.1	1.4	1.3	1.6	1.4	1.8	1.7	1.6	1.5	1.5	1.3	1.0	1.0	1.5	0.7	0.8	0.6
Total Phosphorus as P	mg/L	0.005 - 0.5	4	0.01	0.20	0.23	0.22	0.20	2.84	2.91	2.35	2.32	0.33	0.37	0.32	0.32	0.04	0.06	0.07	0.003
Total Anions	meq/L	-	-	0.01	5.34	5.26	6.18	-	31.4	29.2	26.8	-	10.4	10.0	10.3	-	5.44	11.3	8.50	-
Total Cations	meq/L	-	-	0.01	5.51	5.03	6.19	-	31.0	26.7	26.1	-	10.3	8.71	9.69	-	5.32	10.6	8.49	-
Ionic Balance	%	-	-	0.01	1.59	2.29	0.10	-	0.61	4.46	1.22	-	0.45	6.89	3.16	-	1.10	3.17	0.03	-
Thermotolerant Coliforms	CFU/100mL	<1,000	-	1	<1	~3	~7	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Escherichia coli	CFU/100mL	<230	-	1	<1	~3	~3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Enterococci	CFU/100mL	-	-	1	<1	<1	180	<1	<1	<1	~2	36	<1	~1	<1	<1	<1	<1	<1	<1



Sample ID					DG35				DG36				GW4			
Month					Aug-24	Nov-24	Feb-25	May-25	Aug-24	Nov-24	Feb-25	May-25	Aug-24	Nov-24	Feb-25	May-25
Sample Date					29/08/2025	19/11/2025	18/02/2025	20/05/2025	29/08/2025	19/11/2025	18/02/2025	20/05/2025	29/08/2025	19/11/2025	18/02/2025	20/05/2025
Analyte	Units	Development Consent Trigger Values ¹	GMMP Trigger Values ²	LOR												
pH	-	6.5 - 8.5	6.5 - 8.5	-	6.93 ^A	7.66	6.86	6.9	7.34 ^A	6.76	6.84	7.29	7.44 ^A	7.44	7.33	7.35
Electrical Conductivity (EC)	µS/cm	>1500	33,000	-	1020 ^A	971	961	996	902 ^A	992	1070	1020	911 ^A	883	893	777
Total Dissolved Solids (TDS)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen (DO)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oxydation-Reduction Potential (Redox)	mV	-	-	-	-93 ^A	55	-86	-11	107 ^A	-83	-36	136	189 ^A	148	3	127
Hydroxide Alkalinity as CaCO ₃	mg/L	-	-	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO ₃	mg/L	-	-	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO ₃	mg/L	750	400	1	352	392	339	313	322	314	503	403	214	194	203	182
Total Alkalinity as CaCO ₃	mg/L	-	-	1	352	392	339	313	322	314	503	403	214	194	203	182
Sulfate as SO ₄	mg/L	250	300	1	124	36	102	139	81	116	144	60	14	12	11	11
Chloride (Cl)	mg/L	300	6,900	1	45	66	50	54	56	55	62	69	190	209	195	194
Calcium (Ca)	mg/L	-	-	1	67	81	60	66	67	63	100	99	75	71	71	77
Magnesium (Mg)	mg/L	50	420	1	34	37	32	32	28	32	46	42	19	18	17	18
Sodium (Na)	mg/L	400	5,500	1	116	93	109	108	100	111	80	89	116	112	105	108
Potassium (K)	mg/L	50	170	1	8	15	8	8	13	8	16	16	1	1	<1	<1
Iron (Fe)	mg/L	6	4	0.05	30.6	2.62	29.2	36.3	1.41	27.5	2.64	2.56	0.33	0.20	0.08	0.09
Fluoride (F)	mg/L	-	-	0.1	0.2	0.6	-	-	0.6	0.2	-	-	0.2	0.2	-	-
Ammonium as N	mg/L	-	-	0.01	1.35	0.10	-	0.58	0.11	0.85	-	0.11	0.04	0.02	-	0.05
Ammonia as N	mg/L	20	1	0.01	1.35	0.10	0.84	0.58	0.11	0.85	0.12	0.11	0.04	0.02	0.09	0.05
Nitrite as N	mg/L	-	-	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nitrate as N	mg/L	-	-	0.01	0.04	<0.01	<0.01	<0.01	<0.01	0.28	<0.01	0.02	0.01	0.02	0.01	0.03
Nitrite + Nitrate as N	mg/L	-	-	0.01	0.04	<0.01	<0.01	<0.01	<0.01	0.28	<0.01	0.02	0.01	0.02	0.01	0.03
Total Kjeldahl Nitrogen as N	mg/L	-	-	0.1	1.8	0.2	1.6	1.2	0.4	1.7	0.4	0.3	0.6	<0.1	0.2	0.2
Total Nitrogen as N	mg/L	0.1 - 0.5	-	0.1	1.8	0.2	1.6	1.2	0.4	2.0	0.4	0.3	0.6	<0.1	0.2	0.2
Total Phosphorus as P	mg/L	0.005 - 0.5	4	0.01	1.10	0.26	1.00	1.02	0.19	1.04	0.24	0.21	0.07	0.05	0.14	0.03
Total Anions	meq/L	-	-	0.01	10.9	10.4	10.3	-	9.70	10.2	14.8	-	9.93	10.0	9.78	-
Total Cations	meq/L	-	-	0.01	10.7	10.2	10.6	-	9.84	9.40	12.7	-	9.81	9.92	9.51	-
Ionic Balance	%	-	-	0.01	0.83	1.02	1.27	-	0.72	4.28	7.76	-	0.60	0.52	1.43	-
Thermotolerant Coliforms	CFU/100mL	<1,000	-	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	~9	<1	~25
Escherichia coli	CFU/100mL	<230	-	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	~9	<1	~<1
Enterococci	CFU/100mL	-	-	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	19	21

- A. Water quality parameters recorded on 23 August 2024.
- 1. Generic trigger values provided in Development Consent 195-8-2004
 - 2. Stages 2-4 specific trigger values provided in EES (2018) GMMP



Table 25 Groundwater Monitoring Summary East of Princes Highway

Sample ID					DG5s				DG5d				DG6s			
Month					Aug-24	Nov-24	Feb-25	May-25	Aug-24	Nov-24	Feb-25	May-25	Aug-24	Nov-24	Feb-25	May-25
Sample Date					29/08/2025	19/11/2025	18/02/2025	20/05/2025	29/08/2025	19/11/2025	18/02/2025	20/05/2025	29/08/2025	19/11/2025	18/02/2025	20/05/2025
Analyte	Units	Development Consent Trigger Values ¹	GMMP Trigger Values ²	LOR												
pH	-	6.5 - 8.5	6.5 - 8.5	-	7.94 ^A	7.68	7.17	7.53	7.58 ^A	7.06	6.29	6.89	7.21 ^A	6.39	7.13	6.8
Electrical Conductivity (EC)	µS/cm	>1500	33,000	-	1630 ^A	156	913	904	1770 ^A	1550	14400	14800	3090 ^A	1780	18800	18200
Total Dissolved Solids (TDS)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen (DO)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oxydation-Reduction Potential (Redox)	mV	-	-	-	-3 ^A	-67	-36	102	-19 ^A	-35	-78	64	-72 ^A	76	-124	75
Hydroxide Alkalinity as CaCO ₃	mg/L	-	-	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO ₃	mg/L	-	-	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO ₃	mg/L	750	400	1	278	352	276	232	336	250	333	296	382	347	394	342
Total Alkalinity as CaCO ₃	mg/L	-	-	1	278	352	276	232	336	250	333	296	382	347	394	342
Sulfate as SO ₄	mg/L	250	300	1	146	780	128	132	751	141	534	579	874	715	671	702
Chloride (Cl)	mg/L	300	6,900	1	100	7000	98	95	5430	101	4970	4850	5600	6180	5830	5590
Calcium (Ca)	mg/L	-	-	1	136	352	133	136	262	135	216	234	192	187	180	199
Magnesium (Mg)	mg/L	50	420	1	20	500	19	19	405	22	299	334	445	426	404	420
Sodium (Na)	mg/L	400	5,500	1	63	3880	61	64	3440	63	2560	2800	3540	3420	3280	3360
Potassium (K)	mg/L	50	170	1	4	117	4	4	104	4	80	90	130	129	121	123
Iron (Fe)	mg/L	6	4	0.05	2.68	3.72	2.98	3.05	3.06	3.20	2.49	2.26	6.42	5.36	4.51	4.92
Fluoride (F)	mg/L	-	-	0.1	0.3	0.6	-	-	0.6	0.3	-	-	0.6	0.6	-	-
Ammonium as N	mg/L	-	-	0.01	0.36	2.88	-	0.39	1.69	0.42	-	1.25	0.53	0.52	-	0.69
Ammonia as N	mg/L	20	1	0.01	0.37	2.93	0.40	0.39	1.71	0.42	1.39	1.27	0.53	0.52	0.63	0.69
Nitrite as N	mg/L	-	-	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nitrate as N	mg/L	-	-	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01
Nitrite + Nitrate as N	mg/L	-	-	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01
Total Kjeldahl Nitrogen as N	mg/L	-	-	0.1	0.9	4.7	0.8	0.8	2.2	0.8	2.0	1.7	1.5	1.5	1.7	1.7
Total Nitrogen as N	mg/L	0.1 - 0.5	-	0.1	0.9	4.7	0.8	0.8	2.2	0.8	2.0	1.7	1.5	1.5	1.7	1.7
Total Phosphorus as P	mg/L	0.005 - 0.5	4	0.01	0.16	0.60	0.17	0.17	0.54	0.21	0.55	0.50	0.25	0.25	0.28	0.21
Total Anions	meq/L	-	-	0.01	11.4	221	10.9	-	176	10.8	158	-	184	196	186	-
Total Cations	meq/L	-	-	0.01	10.5	216	11.0	-	191	9.58	149	-	192	181	188	-
Ionic Balance	%	-	-	0.01	4.17	1.20	0.06	-	4.16	5.90	2.99	-	2.08	3.95	0.45	-
Thermotolerant Coliforms	CFU/100mL	<1,000	-	1	<1	<1	<1	<1	<1	~7	<1	<1	<1	~2	<1	<1
Escherichia coli	CFU/100mL	<230	-	1	<1	<1	<1	<1	<1	~7	<1	<1	<1	~2	<1	<1
Enterococci	CFU/100mL	-	-	1	<1	<1	11	<1	<1	~5	<1	<1	<1	<1	~3	<1

Sample ID					DG6d				DG7			
Month					Aug-24	Nov-24	Feb-25	May-25	Aug-24	Nov-24	Feb-25	May-25
Sample Date					29/08/2025	19/11/2025	18/02/2025	20/05/2025	29/08/2025	19/11/2025	18/02/2025	20/05/2025
Analyte	Units	Development Consent Trigger Values ¹	GMMP Trigger Values ²	LOR								
pH	-	6.5 - 8.5	6.5 - 8.5	-	6.99 ^A	6.49	6.77	6.75	7.37 ^A	6.97	6.84	7.18
Electrical Conductivity (EC)	µS/cm	>1500	33,000	-	1910 ^A	2930	29300	28200	684 ^A	654	700	671
Total Dissolved Solids (TDS)	mg/L	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen (DO)	mg/L	-	-	-	-	-	-	-	-	-	-	-
Oxydation-Reduction Potential (Redox)	mV	-	-	-	-13 ^A	16	-94	62	136 ^A	83	72	120
Hydroxide Alkalinity as CaCO ₃	mg/L	-	-	1	<1	<1	<1	<1	<1	<1	<1	fr
Carbonate Alkalinity as CaCO ₃	mg/L	-	-	1	<1	<1	<1	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO ₃	mg/L	750	400	1	455	397	440	384	306	241	248	237
Total Alkalinity as CaCO ₃	mg/L	-	-	1	455	397	440	384	306	241	248	237
Sulfate as SO ₄	mg/L	250	300	1	1600	1450	1360	1400	39	35	37	35
Chloride (Cl)	mg/L	300	6,900	1	9510	9800	9250	8640	32	47	60	48
Calcium (Ca)	mg/L	-	-	1	411	409	401	432	70	57	60	65
Magnesium (Mg)	mg/L	50	420	1	745	745	704	709	21	17	17	18
Sodium (Na)	mg/L	400	5,500	1	5930	5900	5470	5480	80	72	74	74
Potassium (K)	mg/L	50	170	1	184	194	182	177	2	2	2	2
Iron (Fe)	mg/L	6	4	0.05	19.6	21.2	20.6	17.3	1.16	1.06	0.88	1.75
Fluoride (F)	mg/L	-	-	0.1	0.4	0.3	-	-	0.5	0.5	-	-
Ammonium as N	mg/L	-	-	0.01	0.87	0.86	-	0.96	1.06	0.99	-	1.11
Ammonia as N	mg/L	20	1	0.01	0.87	0.86	0.81	0.96	1.07	0.99	0.80	1.11
Nitrite as N	mg/L	-	-	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nitrate as N	mg/L	-	-	0.01	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01
Nitrite + Nitrate as N	mg/L	-	-	0.01	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01
Total Kjeldahl Nitrogen as N	mg/L	-	-	0.1	1.7	1.6	1.9	2.1	1.9	1.2	1.2	1.4
Total Nitrogen as N	mg/L	0.1 - 0.5	-	0.1	1.7	1.6	1.9	2.1	1.9	1.2	1.2	1.4
Total Phosphorus as P	mg/L	0.005 - 0.5	4	0.01	0.47	0.58	0.60	0.59	0.23	0.22	0.18	0.66
Total Anions	meq/L	-	-	0.01	311	314	298	-	7.83	6.87	7.42	-
Total Cations	meq/L	-	-	0.01	336	310	320	-	8.18	6.77	7.66	-
Ionic Balance	%	-	-	0.01	3.89	0.67	3.64	-	2.22	0.72	1.62	-
Thermotolerant Coliforms	CFU/100mL	<1,000	-	1	<1	<1	<1	<1	<1	<1	<1	<1
Escherichia coli	CFU/100mL	<230	-	1	<1	<1	<1	<1	<1	<1	<1	<1
Enterococci	CFU/100mL	-	-	1	<1	<1	~1	<1	<1	<1	<1	<1

A. Water quality parameters recorded on 23 August 2024.

1. Generic trigger values provided in Development Consent 195-8-2004
2. Stages 2-4 specific trigger values provided in EES (2018) GMMP



Table 24 Groundwater Monitoring Summary Stage 5

Sample ID						MWSA1				MWSA3				MWSB2d			
Month						Aug-24	Nov-24	Feb-25	May-25	Aug-24	Nov-24	Feb-25	May-25	Aug-24	Nov-24	Feb-25	May-25
Sample Date						29/08/2025	19/11/2025	18/02/2025	20/05/2025	29/08/2025	19/11/2025	18/02/2025	20/05/2025	29/08/2025	19/11/2025	18/02/2025	20/05/2025
Analyte	Units	Development Consent Trigger Values ¹	GMMP Trigger Values ²	SWMP Water Quality Objective ³	LOR												
pH	-	6.5 - 8.5	6.5 - 8.5	6.5 - 8.5	-	7.77 ^A	7.85	8.37	7.58	7.39 ^A	7.63	7.71	6.99	7.49 ^A	7.13	7.39	7.24
Electrical Conductivity (EC)	µS/cm	>1500	33,000	>1500	-	913 ^A	900	702	859	313 ^A	291	272	286	734 ^A	721	698	667
Total Dissolved Solids (TDS)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen (DO)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oxydation-Reduction Potential (Redox)	mV	-	-	-	-	-66 ^A	-33	-42	-11	56 ^A	36	-101	42	-58 ^A	-34	-10	83
Hydroxide Alkalinity as CaCO ₃	mg/L	-	-	-	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO ₃	mg/L	-	-	-	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO ₃	mg/L	750	400	750	1	63	246	90	91	63	46	59	58	313	283	301	257
Total Alkalinity as CaCO ₃	mg/L	-	-	-	1	63	246	90	91	63	46	59	58	313	283	301	257
Sulfate as SO ₄	mg/L	250	300	250	1	34	28	24	23	16	10	<1	<10	28	19	14	12
Chloride (Cl)	mg/L	300	6,900	300	1	143	89	60	46	34	69	43	42	48	60	55	62
Calcium (Ca)	mg/L	-	-	-	1	15	78	18	30	8	5	6	8	111	99	94	93
Magnesium (Mg)	mg/L	50	420	50	1	14	20	8	9	2	2	3	3	16	15	14	13
Sodium (Na)	mg/L	400	5,500	400	1	90	58	51	44	48	43	44	46	51	48	47	51
Potassium (K)	mg/L	50	170	50	1	5	6	4	5	2	2	2	3	7	6	6	6
Iron (Fe)	mg/L	6	4	6	0.05	2.19	4.31	1.54	2.26	1.27	1.28	0.48	0.57	3.74	3.84	3.73	3.76
Fluoride (F)	mg/L	-	-	-	0.1	<0.1	0.1	-	-	0.2	0.1	-	-	0.2	0.2	-	-
Ammonium as N	mg/L	-	-	-	0.01	0.48	0.37	-	0.42	0.32	0.30	-	0.38	0.53	0.63	-	0.59
Ammonia as N	mg/L	20	1	20	0.01	0.49	0.38	0.54	0.42	0.32	0.30	0.35	0.38	0.54	0.63	0.63	0.59
Nitrite as N	mg/L	-	-	-	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nitrate as N	mg/L	-	-	-	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	0.01	0.01	<0.01	<0.01	0.01
Nitrite + Nitrate as N	mg/L	-	-	-	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	0.01	0.01	<0.01	<0.01	0.01
Total Kjeldahl Nitrogen as N	mg/L	-	-	-	0.1	1.3	1.2	1.3	1.3	1.1	0.9	1.1	1.4	1.1	1.0	1.0	1.1
Total Nitrogen as N	mg/L	0.1 - 0.5	-	0.1 - 0.5	0.1	1.3	1.2	1.3	1.3	1.1	0.9	1.1	1.4	1.1	1.0	1.0	1.1
Total Phosphorus as P	mg/L	0.005 - 0.5	0.004	0.005 - 0.5	0.01	0.09	0.21	0.08	0.06	0.13	0.14	0.12	0.08	0.11	0.13	0.10	0.10
Total Anions	meq/L	-	-	-	0.01	6.00	8.01	3.99	-	2.55	3.07	2.39	-	8.19	7.74	7.86	-
Total Cations	meq/L	-	-	-	0.01	5.58	8.21	3.88	-	2.65	3.11	2.51	-	8.60	7.22	8.04	-
Ionic Balance	%	-	-	-	0.01	3.58	1.24	1.44	-	---	0.57	---	-	2.45	3.51	1.16	-
Thermotolerant Coliforms	CFU/100mL	<1,000	-	<1,000	1	<1	~2	<1	<1	<1	~2	<1	~1	<1	<1	<1	<1
Escherichia coli	CFU/100mL	<230	-	<230	1	<1	~1	<1	<1	<1	~1	<1	<1	<1	<1	<1	<1
Enterococci	CFU/100mL	-	-	-	1	<1	~1	<1	<1	<1	~1	<1	<1	<1	<1	<1	<1



Sample ID						MW5B2s				MW5B3				MW5B4			
Month						Aug-24	Nov-24	Feb-25	May-25	Aug-24	Nov-24	Feb-25	May-25	Aug-24	Nov-24	Feb-25	May-25
Sample Date						29/08/2025	19/11/2025	18/02/2025	20/05/2025	29/08/2025	19/11/2025	18/02/2025	20/05/2025	29/08/2025	19/11/2025	18/02/2025	20/05/2025
Analyte	Units	Development Consent Trigger Values ¹	GMMP Trigger Values ²	SWMP Water Quality Objective ³	LOR												
pH	-	6.5 - 8.5	6.5 - 8.5	6.5 - 8.5	-	7.37 ^A	7.07	7.3	7.08	7.64 ^A	7.43	7.57	7.55	7.68 ^A	7.55	7.79	7.55
Electrical Conductivity (EC)	µS/cm	>1500	33,000	>1500	-	672 ^A	743	769	817	412 ^A	524	506	475	424 ^A	417	390	502
Total Dissolved Solids (TDS)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen (DO)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oxydation-Reduction Potential (Redox)	mV	-	-	-	-	-66 ^A	32	-147	-3	46 ^A	8	-78	14	128 ^A	47	-61	69
Hydroxide Alkalinity as CaCO ₃	mg/L	-	-	-	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO ₃	mg/L	-	-	-	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO ₃	mg/L	750	400	750	1	216	334	355	353	300	242	245	214	224	223	196	239
Total Alkalinity as CaCO ₃	mg/L	-	-	-	1	216	334	355	353	300	242	245	214	224	223	196	239
Sulfate as SO ₄	mg/L	250	300	250	1	<10	<1	<1	25	<1	<1	<1	<1	3	1	2	<1
Chloride (Cl)	mg/L	300	6,900	300	1	16	63	65	62	46	31	33	25	15	19	19	21
Calcium (Ca)	mg/L	-	-	-	1	117	131	124	151	77	83	81	86	82	103	65	95
Magnesium (Mg)	mg/L	50	420	50	1	14	12	11	12	7	9	8	7	8	10	6	9
Sodium (Na)	mg/L	400	5,500	400	1	38	44	47	54	19	29	26	23	14	18	16	21
Potassium (K)	mg/L	50	170	50	1	4	4	4	4	2	3	2	2	2	3	2	3
Iron (Fe)	mg/L	6	4	6	0.05	1.84	3.89	3.80	4.30	0.14	0.65	0.52	0.42	2.72	5.94	0.58	0.80
Fluoride (F)	mg/L	-	-	-	0.1	0.3	0.2	-	-	0.2	0.3	-	-	0.3	0.2	-	-
Ammonium as N	mg/L	-	-	-	0.01	0.41	0.24	-	0.23	0.32	0.50	-	0.36	0.35	0.63	-	0.43
Ammonia as N	mg/L	20	1	20	0.01	0.41	0.24	0.27	0.23	0.33	0.51	0.46	0.37	0.36	0.64	0.44	0.44
Nitrite as N	mg/L	-	-	-	0.01	<0.01	<0.01	<0.01	<0.01	0.09	<0.01	<0.01	<0.01	0.04	<0.01	<0.01	<0.01
Nitrate as N	mg/L	-	-	-	0.01	5.45	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	0.01	<0.01
Nitrite + Nitrate as N	mg/L	-	-	-	0.01	5.45	<0.01	<0.01	<0.01	0.04	<0.01	<0.01	<0.01	<0.01	0.02	0.01	<0.01
Total Kjeldahl Nitrogen as N	mg/L	-	-	-	0.1	2.5	1.2	1.2	1.3	0.8	0.7	0.7	0.8	0.9	1.5	0.9	1.1
Total Nitrogen as N	mg/L	0.1 - 0.5	-	0.1 - 0.5	0.1	8.0	1.2	1.2	1.3	0.8	0.7	0.7	0.8	0.9	1.5	0.9	1.1
Total Phosphorus as P	mg/L	0.005 - 0.5	0.004	0.005 - 0.5	0.01	0.09	0.18	0.17	0.16	0.08	0.11	0.12	0.09	0.33	0.67	0.14	0.10
Total Anions	meq/L	-	-	-	0.01	4.77	8.45	8.93	-	7.29	5.71	5.82	-	4.96	5.01	4.49	-
Total Cations	meq/L	-	-	-	0.01	4.81	8.11	9.24	-	8.10	5.40	5.88	-	4.92	4.66	4.48	-
Ionic Balance	%	-	-	-	0.01	0.50	2.05	1.72	-	5.23	2.76	0.48	-	0.39	3.62	0.10	-
Thermotolerant Coliforms	CFU/100mL	<1,000	-	<1,000	1	<1	~1	<1	<1	<1	<1	<1	<1	<1	<1	~1	<1
Escherichia coli	CFU/100mL	<230	-	<230	1	<1	~1	<1	<1	<1	<1	<1	<1	<1	<1	~1	<1
Enterococci	CFU/100mL	-	-	-	1	<1	~3	<1	<1	<1	<1	<1	<1	<1	16	<1	<1

- A. Water quality parameters recorded on 23 August 2024.
- 1. Generic trigger values provided in Development Consent 195-8-2004
 - 2. Stages 2-4 specific trigger values provided in EES (2018) GMMP
 - 3. Stage 5 specific trigger values provided in EMM (2021) SWMP



4.7.3. Groundwater Long Term Assessment and Analysis

The data obtained from the data loggers installed in bores DG1, DG5, DG6, DG7, DG17, DG21, DG31, DG35, and DG36 indicate that over the current reporting period natural fluctuations in water levels were occurring in response to rainfall and tidal influences. This is consistent with previous findings dating back to 2003 (Environmental Earth Sciences 2009, 2010, 2011, 2012, 2013a, 2014, 2015, 2016a, 2017 and 2018a, 2019, 2020, 2021, 2022, 2023, 2024).

All data obtained from the monitored bores strongly indicated the following:

- Influences on groundwater levels are related to recharge from rainfall and minor tidal influx (this finding is supported by chemical monitoring of tidal seawater intrusion from Rocklow Creek);
- Reductions in groundwater levels are related to periods of low rainfall where the aquifer is slowly draining from Rocklow Creek and the south-east aquifer boundary; and
- Water-table fluctuations are therefore naturally occurring and cannot be seen to be impacted by dredging activities in the area, except in immediate proximity to the dredge pond.

4.7.4. Groundwater Summary and Opportunities for Improvement

Based on the results of the annual monitoring for the 2024 to 2025 period, it is recommended that quarterly GMEs and monthly groundwater gauging continue to be conducted for Stages 2-4 and Stage 5 at the site, in accordance with the applicable site management plans (EES 2018 and EMM2025)

4.8. Rehabilitation and Flora and Fauna Management Review

Rehabilitation has been ongoing since operations began and includes landform construction, planting out and maintenance of previous planting campaigns.

4.8.1. Rehabilitation Assessment Criteria

Condition S4.C42 of the consent outlines that the applicant must progressively rehabilitate the site to the satisfaction of the secretary in a manner generally consistent with the concept final landform in the EIS (Appendix 2 of DA 195-8-2004) and in accordance with the DA consent.

S3.C37 outlines that the site must establish and conserve:

- 6 hectares of Freshwater Wetlands on Coastal Floodplains (which may include areas of associated wetland pondage) and;
- 3 hectares of Swamp Oak Floodplain forest;

The final landform planned for the DLSP will exceed these areas. This is in order to provide suitable visual screening and to adequately integrate a compensatory habitat with existing similar habitats located on or near the site.

4.8.2. Rehabilitation and Flora and Fauna Management Performance Review

Rehabilitation works are ongoing along the northern area of stage 2 with 6,300 native plants from the Swamp Oak Forest and Freshwater Wetlands in Coastal Floodplains community types planted along the north western edge of Stage 2 in 2017. A bird island was also constructed and planted out with the communities and species described above.

The banks of the realigned Western Tributary channel in Stage 3 commenced rehabilitation in 2017, with the laying of jute matting and approximately 2,600 tube stock of freshwater wetland species planted out.

In December 2019 a further 8500m² of Swamp Oak forest was planted on the NE section of Stage 2. These saplings are progressing well.

The tree screens planted in 2007 are progressing well with individuals now 14 years old.

Landform construction using VENM is ongoing along the southern and eastern section of Stage 2. This landform will form the foundations for a further section of Swamp Oak Forest to be planted. The location of rehabilitation areas can be seen below in Figure 25.

Additional work related to the Swamp Oak Forest will commence in the following reporting period.



Figure 245 Rehabilitation Area Locations

Maintenance of these sections has been ongoing throughout the current reporting period by the bushland regeneration contractor Jamberoo Native Nursery, which works on site weekly.

In the previous reporting period 143 nest boxes were installed in the surrounding Bangalow forest at Stage 5B to provide habitats for the fauna that may be impacted by the associated vegetation removal. These range from small bird boxes approximately 30cm tall and 25cm wide to Powerful Owl boxes that are over one meter tall and 90 centimetres wide.

The rehabilitation at Stage 5A has commenced, and backfilling with VENM is underway towards the final landform.

The Rehabilitation and Conservation Bond for DSS, including Stage 5B, has been lodged.

Prior to commencement of operations in Stage 5B, an EPBC referral was completed and approved by the federal government.

4.8.3. Rehabilitation and Fauna and Flora Management Long Term Analysis and Assessment

Planted sections have progressed well with many specimens now over 3m tall. So far approximately 2.4 hectares of Swamp Oak Forest and Freshwater Wetland communities have been planted. Comparison photos over the last four reporting periods are shown in Appendix D.

4.8.4. Rehabilitation and Flora and Fauna Summary and Opportunities for Improvement

Maintenance of planted areas will continue during the next reporting period. Backfilling works and landform construction will continue in the next reporting period. An extension of the Swamp Oak Forest at Stage 2 is scheduled for October-November 2025.

Nest boxes at Stage 5B will be evaluated every six months in accordance with section 4.6 of the Flora and Fauna Management Plan.

Rehabilitation of Stage 5A will continue in next reporting period to return the area to pasture.

4.9. Waste Management

Operational waste associated with the project includes management of production fines generated by the processing plant and VENM received for backfilling of ponds and rehabilitation. Both of these materials will be used to progressively rehabilitate previously extracted areas to create wetlands and flood-free land for the final landform. Backfilling is currently underway at Stage 2, Stage 3 and Stage 5A.

4.9.1. VENM Verification Acceptance and Disposal

In January 2018, the site began accepting Virgin Excavated Natural Material from external sources for the purposes of backfill to support site rehabilitation. VENM is classified as an 'inert' non-liquid waste under Schedule 1 Part 3 of the Protection of the Environment Operations Act 1997 and defines VENM as being:

"Virgin excavated natural material (e.g. clay, gravel, sand, soil and rock) that is not mixed with any other waste and that:

(a) has been excavated from areas that are not contaminated, as a result of industrial, commercial, mining or agricultural activities, with manufactured chemicals and that does not contain sulphidic ores or soils, or

(b) consists of excavated natural materials that meet such criteria as may be approved by the EPA.”

Approximately 5 million tonnes of VENM will be required to create the final landform detailed in the Rehabilitation Management Plan. The vast majority of this material will be VENM within the meaning of part (a) above. A small portion of the backfilling materials for the project will consist of VENM within the meaning of part (b) above.

EPL 11147 contains specific conditions relating to VENM verification and acceptance including provisions to accept VENM (b) material that satisfies all the requirements for classification as VENM, except that it contains Potential Acid Sulfate Soil (PASS). After placement of the first load of PASS special frequency water monitoring of Stage 2 surface water and groundwater is triggered. The results of this monitoring is detailed in Section 4.4.2.

Volumes of external VENM received for the current reporting period are detailed below in Table 24.

Table 25 VENM and PASS Backfilling Volumes

Month	VENM (a) received (t)	VENM (b) PASS received (t)	Excavated Sand VENM received (t)
Jul-24	16,783	772	0
Aug-24	16,756	1,921	0
Sep-24	12,273	1,627	0
Oct-24	23,183	0	0
Nov-24	36,684	0	0
Dec-24	23,252	0	0
Jan-25	28,476	3,122	0
Feb-25	40,103	1,774	0
Mar-25	51,406	1,347	0
Apr-25	26,585	0	0
May-25	10,832	95	0
Jun-25	31,980	0	0
Total	301,529	9,886	0

4.9.2. Waste Minimisation and Tracking

Boral is committed to ensuring its extraction and processing activities produce minimal waste material. Approximately 85-90% of the sand processed at Dunmore Sand and Soil becomes washed sand for internal and external sales.

The remaining 10-15% of by-product created during the washing process is considered as fines material or oversized material. The fines material is washed into the fines ponds, which is used in the creation of the wetlands area, while the oversized product is used in site rehabilitation.

Boral is committed to non-production waste minimisation in accordance with the waste hierarchy, and minimising the amount of waste sent to landfill. To achieve this, all liquid and

solid wastes are classified and sorted so they can be appropriately re-used or recycled. Table 25 outlines the total waste and waste types generated by DLSP over the reporting period.

Table 26 Waste Tracking Register

	General Waste (t)	Cardboard (t)	Comingle Recycling (t)	Oil/Oily Waters (t)	Effluent (t)	Solvent (t)
Jul-24	0.42	0.18	0	0	0	0
Aug-24	0.28	0.06	0	0	0	0
Sep-24	0.17	0.04	0.03	0	0	0
Oct-24	0.26	0.04	0	0	0	0
Nov-24	0.78	0.05	0	0	0	0
Dec-24	0.23	0.03	0	0	0	0
Jan-25	0.38	0	0	0	0	0
Feb-25	0.23	0.04	0	0	0	0
Mar-25	0.25	0.06	0	9	0	0
Apr-25	0.12	0.03	0	0	0	0
May-25	0.28	0.12	0	0	0	0
Jun-25	0.18	0.08	0	0	0	0
Total	3.56	0.72	0.03	9	0	0

4.9.3. Waste Minimisation Long Term Trends and Analysis

The long term analysis of the waste tracking over the last 5 years is shown below in Table 26.

Table 27 Historical Waste Tracking Summary

Waste Classification		FY21	FY22	FY23	FY24	FY25
Solid Waste	General Waste (t)	1.301	3.249	3.23	3.91	3.56
	Cardboard (t)	0.354	0.755	0.98	1.28	0.72
	Comingle (t)	0.114	0.189	0.03	0.03	0.03
Liquid Waste	Oil/Oily Water (t)	0.35	5.74	0	0	9
	Effluent Litres (t)	0.7	6.28	0	0	0
	Other (t)	0	0	0	0	0

*all liquid waste volumes have been converted to tonnages in the FY25 register.

General Waste volumes were similar to the previous reporting period.

4.9.4. Waste Management Summary and Opportunities for Improvement

Education on efficient waste re-use will continue in the next reporting period. VENM will continue to be utilised from Dunmore Quarry and external sources. Further work will continue with subcontractors to optimise the record keeping for waste collection.

4.10. Incident and Emergency Response Management.

The following management actions were undertaken in regard to incident and emergency response.

- The Pollution Incident Response Management Plan was updated in June 2025. The current version is available online on the Boral Dunmore Operations website.
- A Site Emergency Response Plan is available onsite in order to outline procedures in the case of emergency authorities being required on the site.

4.11. Dangerous and Hazardous Goods Storage

Storage of dangerous goods and hazardous material have continued as per established operations. All dangerous goods and chemicals are handled and transported in accordance with the AS1940 and AS25956 and the Dangerous Goods Code and condition S3.C70.

4.12. Community

The DLSP Community Consultative Committee (CCC) continues to serve as a valuable dialogue between Boral and the local community with input and feedback being provided by the community regarding quarry operations and plans. The CCC is run as per condition S5.C6 and the Department of Planning, Industry and Environment's *Community Consultative Committee Guidelines for State Significant Developments* (2016).

Members include:

- An independent chairperson
- At least 2 representatives from Boral (typically the environmental co-ordinator and quarry manager)
- A member from Shellharbour City Council
- Five local community representatives

Members are informed of the environmental performance of the site, provided with an update on operations and given a chance to tour the site and ask questions they may have regarding the operation. CCC members have also been diligent in disseminating the information from the meetings to other interested community members in the local area. The minute of each meeting is published in the Boral website.

<https://www.boral.com.au/locations/boral-dunmore-operations>

The CCC met twice during the current reporting period (August 2024 and February 2025).

4.12.1. Environmental Complaints Management

DLSP maintains a complaints register that identifies actions required to resolve issues and concerns raised by the community. The complaints register is also published on the Boral website.

There were three community complaint during the reporting period, as follows:

- On 29 July 2024 the site received complaints relating to noise and dust believed to be emanating from Stage 5B from one community member.
- On 2 August 2024, the EPA received a complaint regarding debris build-up at the intersection of Stage 5A and Riverside Drive. The material was promptly removed, and the EPA acknowledged the swift response. DLSP was issued an official warning. In response, improvements to site protocols have since been implemented to prevent recurrence of such incidents.

Figure 24 provides an overview of the noise, vibration, water and dust complaints received since 2007. There have been minimal complaints received over the history of the project.

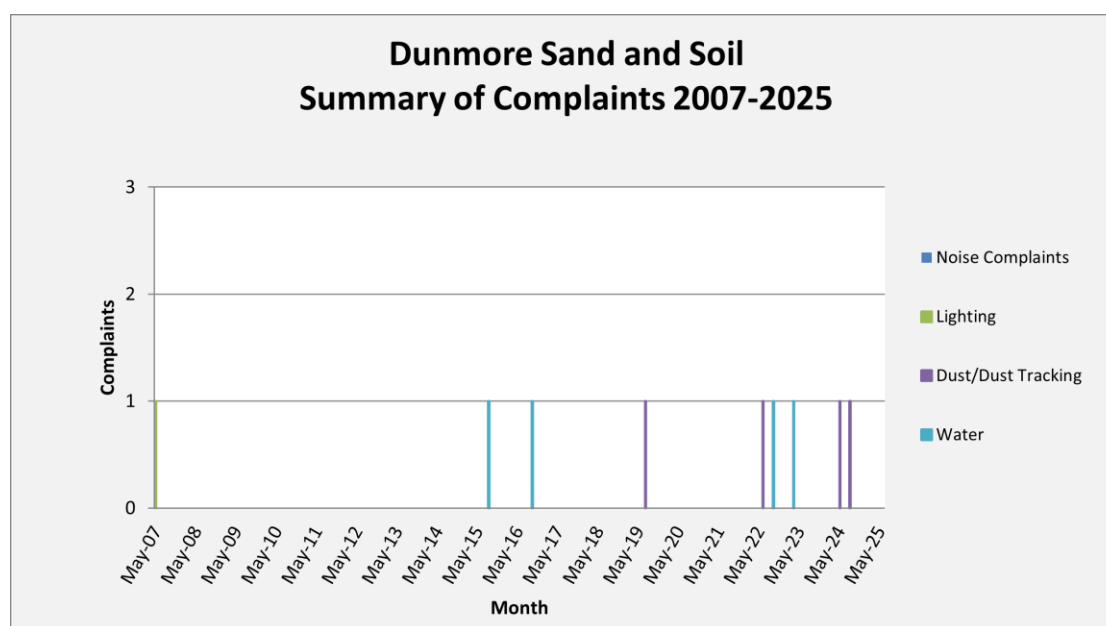


Figure 256 Summary of Historical Complaints

4.13. Independent Environmental Audit

The last Independent Environmental Audit (IEA) was completed in accordance with Schedule 5, Condition 10 and 11 of DA 195-8-2004. The audit site visit was completed on 21 November 2023 and the audit report was finalised on 16 February 2024. Noting there are a number of matters that require improvement, the overall environmental performance based on the observed condition of the site, the low number of non-compliances and incidents and low number of complaints, is considered '**satisfactory**'. It was identified that there were 9 non-compliances, and the Boral responses to these are in Appendix F.

The audit report is available under the public reporting tab on the Dunmore operations website <https://www.boral.com.au/locations/boral-dunmore-operations>. The next Independent Audit is scheduled to occur in November 2026.

4.14. Summary of Regulator Notifications

As per Condition S5, C7, DSS advised DPHI of the following:

- Tracking event at Stage 5A on Riverside Drive.
- Sand spill event in culvert.

5. Conclusion

DLSP continues to focus on ensuring the environment and the neighbouring community are not adversely impacted by site operations.

This reporting period saw the continuation of rehabilitation within the Stage 2 area, which will remain a strong focus during the next reporting period. Rehabilitation will continue in Stage 2, Stage 3 and Stage 5.

The focus over the following 12 months will be continuing operational compliance and utilising remaining resource reserves. Dredging will be on-going at Stage 5B, as well as backfilling at Stage 5A to move toward the final landform.

6. Activities to be completed by the Next Reporting Period

The next reporting period will contain a strong focus on maintaining regulatory compliance and optimising management actions established in the current reporting period.

A list of actions to be completed by the next reporting period is provided below.

- Continue rehabilitation monitoring of planted sections of Swamp Oak Forest and Freshwater Wetland EEC in Stage 2 and Re-aligned Western Tributary;
- Continue backfilling and landform construction in Stage 5a;
- Plant out a further section of Swamp Oak Forest on the eastern edge of Stage 2;
- Continue assessing salinity in the southern section of Stage 3 as per the recommendations in the DLSP EIS;
- Proceed with Stage 5 operations as per the associated management plans;
- Update Stage 2-4 Water Management for the use of site specific trigger values as per the independent auditor recommendations and to align with Stage 5 Soil and Water Management Plan. The updated plans will be combined into a one Soil and Water Management Plan;
- Review GMMP triggers;
- Continue ecological assessment program and maintenance in relation to the use of nest boxes; and
- Continuation of surface water sampling as per PRP requirements.
- Continuation of investigation and improvement of flow methodology and implementation as per PRP requirements.
- On-going maintenance of invasive weed species.

7. Appendix A Meteorological Monitoring

The location of the onsite weather station is shown below.

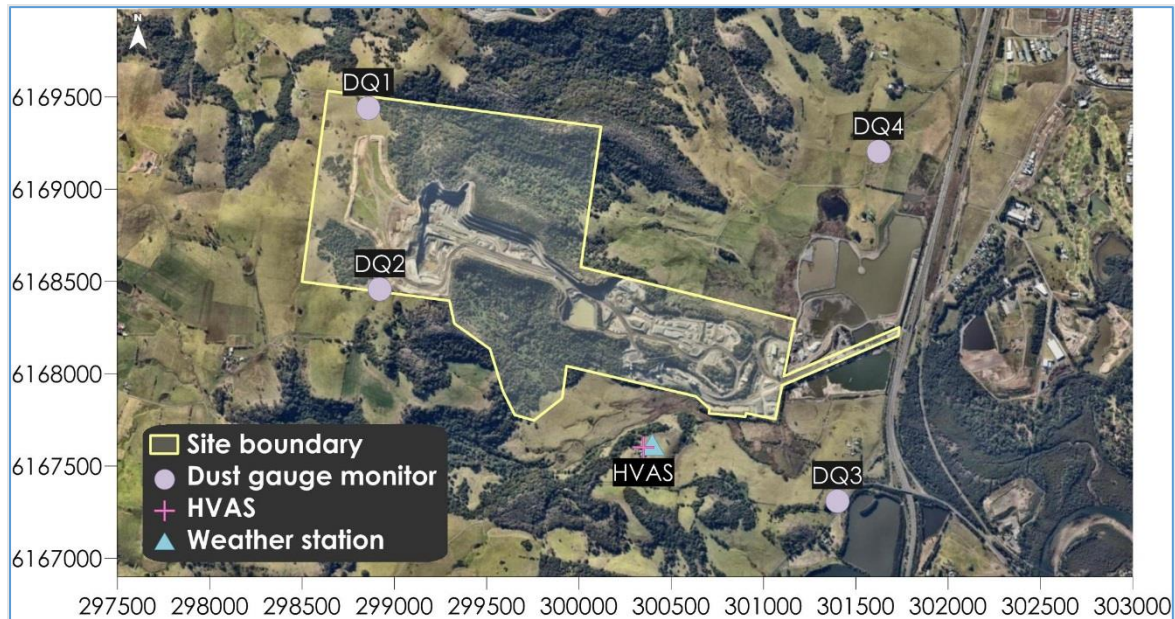


Figure 267 Weather Station Location

A monthly review of weather data is undertaken by the environmental co-ordinator. Important meteorological conditions that are assessed include rainfall, wind speed direction and atmospheric stability.

Rainfall data has been collected since FY2003. A summary of the rainfall measured from the Dunmore Quarry weather station is shown below in Table 28. Historical trends are shown in Table 29 and in red are the months where rainfall was above the regional average.

Table 288 Dunmore Rainfall Summary

Rainfall (mm)			
Month	Current Period	Reporting	Site Average
July	67.8		77.9
August	27		67.7
September	45.8		52.1
October	21.2		75.1
November	122.4		98.4
December	41.6		85.7
January	125.8		90.5
February	41.2		147.1
March	177		163.4
April	63.8		99.3
May	207.8		93.7
June	2.6		105.3
Total	944		1156.1

Table 299 Dunmore Historical Rainfall

	Rainfall (mm)																											
Month	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	Site Average	Regional Average			
July	20	23.5	54.2	41	96	30.5	63.5	35.5	78	194	39	61.7	5	48	97.5	25	6	20.5	264.2	14.8	450	56.8	67.8	77.9	49			
August	13.5	38.5	23	3	42.5	58.5	39	0.5	72	85.5	4.5	17	252	327	76	39	31	39	187.1	73.4	39.4	67.6	27	67.7	53.5			
September	14	7.5	40.6	33	101	39	56	19.5	146	58.5	11.5	85.5	48.7	82	51	1	41.5	59.5	11.3	46.37	145.2	53.4	45.8	52.1	42.7			
October	6.5	49	245	48	0	17	79	126	126	125	83.5	6.5	103	36.5	32	14.5	128	38.5	114.4	61.85	243.8	22.4	21.2	75.1	64.5			
November	17	150	127	145	39.5	162	46.5	65	198	164	25	173	24	48	33	85	92	25.5	83	164.1	61.2	216.2	122.4	98.4	83.1			
December	70	40.5	136	36.5	54	120	113	80.5	148	63	32	70.5	234	117	58	53	90.5	2.5	83.8	78.36	41.8	207.4	41.6	85.7	67			
January	68	30.5	129	90	0	65.5	9.5	79	59.5	50.5	183	43.5	193	156	32.5	36	144	65	189.3	151	125	57.4	125.8	90.5	72.9			
February	112	70	180	87.1	187	352	108	198	48	258	143	59	113	29.5	283	129	35.5	272.5	88.4	295.8	225.4	71.8	41.2	147.1	140.5			
March	121	84	118	43.5	67.5	36.5	39	74	363	196	23.5	326	57	145	441	41.5	157	65.5	278.5	670.6	153	80.8	177	163.4	122.3			
April	91.5	200	24.4	8	145	90.5	106	63	37.4	87.5	136	64.5	305	37.5	40.5	26.1	48.5	85	5.9	216.8	140.4	261	63.8	99.3	73.8			
May	428	43.5	85.6	65.5	23	8	20	80.5	58.3	9.5	81	13	53.5	35.5	51.5	44	13.5	52	206.1	202.8	77.6	296	207.8	93.7	55.8			
June	74.5	42	84.4	124	319	85.5	67	52	92	89	239	34	76	429	57	134	103	35	44	1.8	12.6	225	2.6	105.3	93.7			
Total	1036	779	1248	724	1074	1064	746	873	1425	1379	1001	954	1462	1490	1253	627	890	760.5	1556	1978	1715	1616	944	1156.1	925.6			

Monthly wind roses and seasonal wind roses are shown below in Figure 28 to Figure 38. Please note calm is defined as winds averaging less than 0.3m/s over the averaging period.

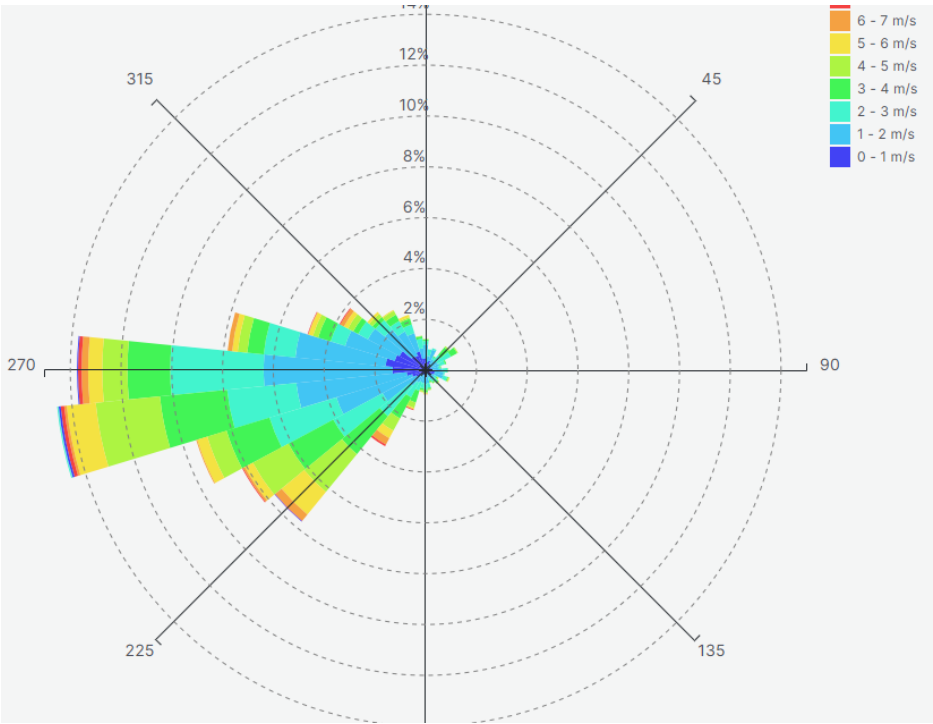


Figure 278 July 2024 Wind Rose

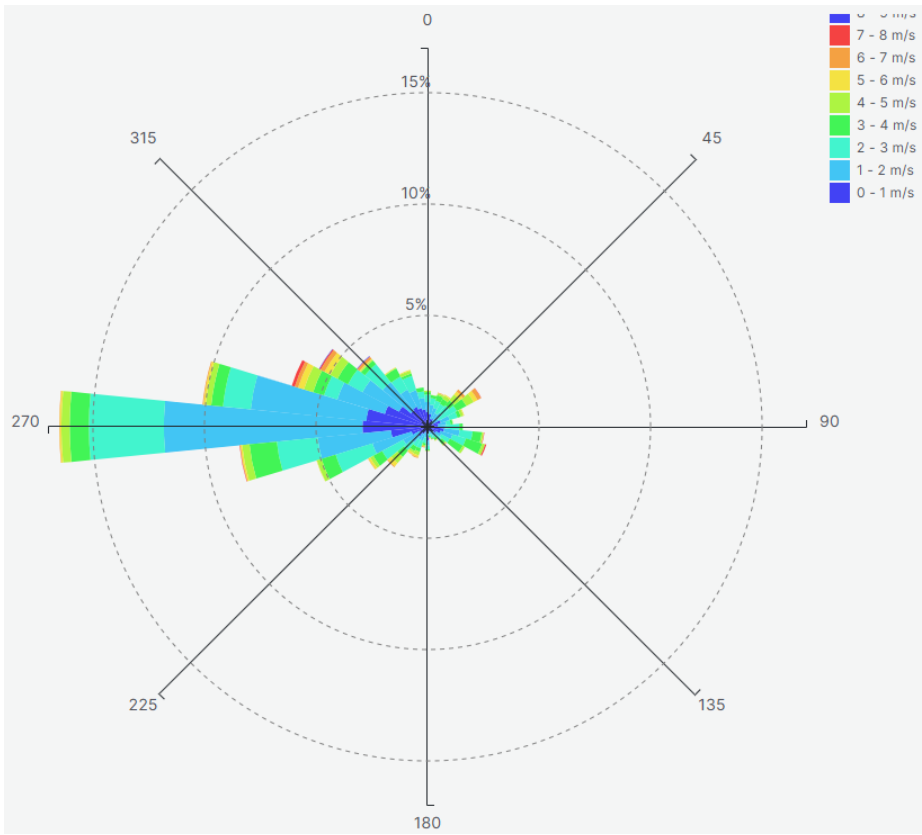


Figure 289 August 2024 Wind Rose

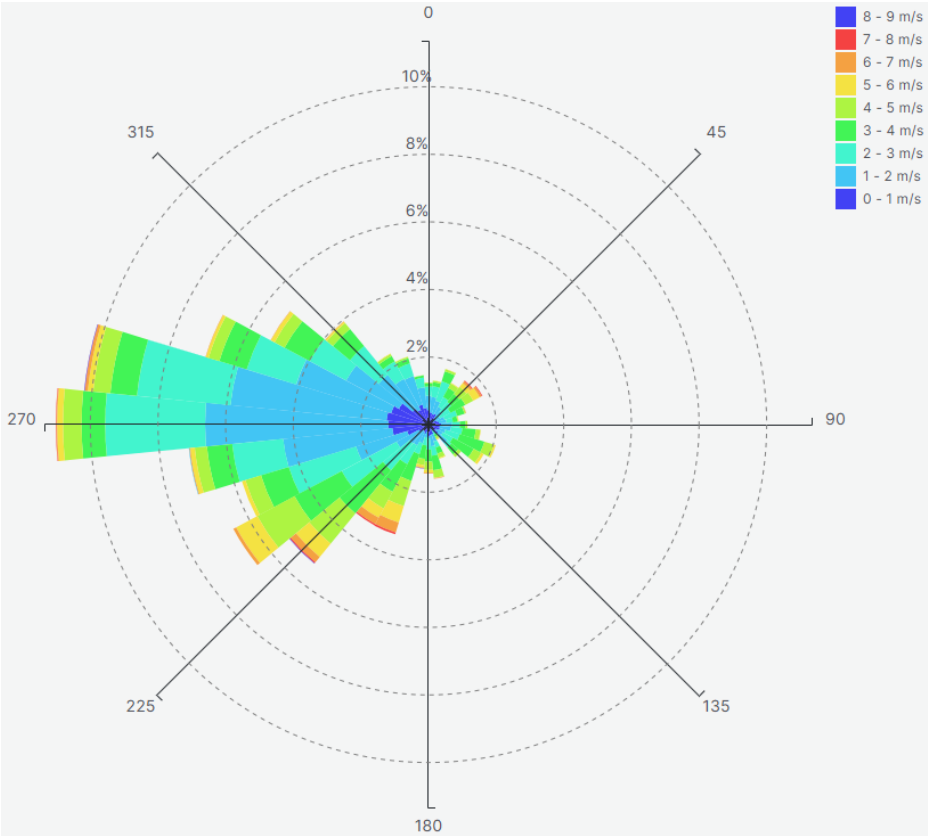


Figure 30 September 2024 Wind Rose

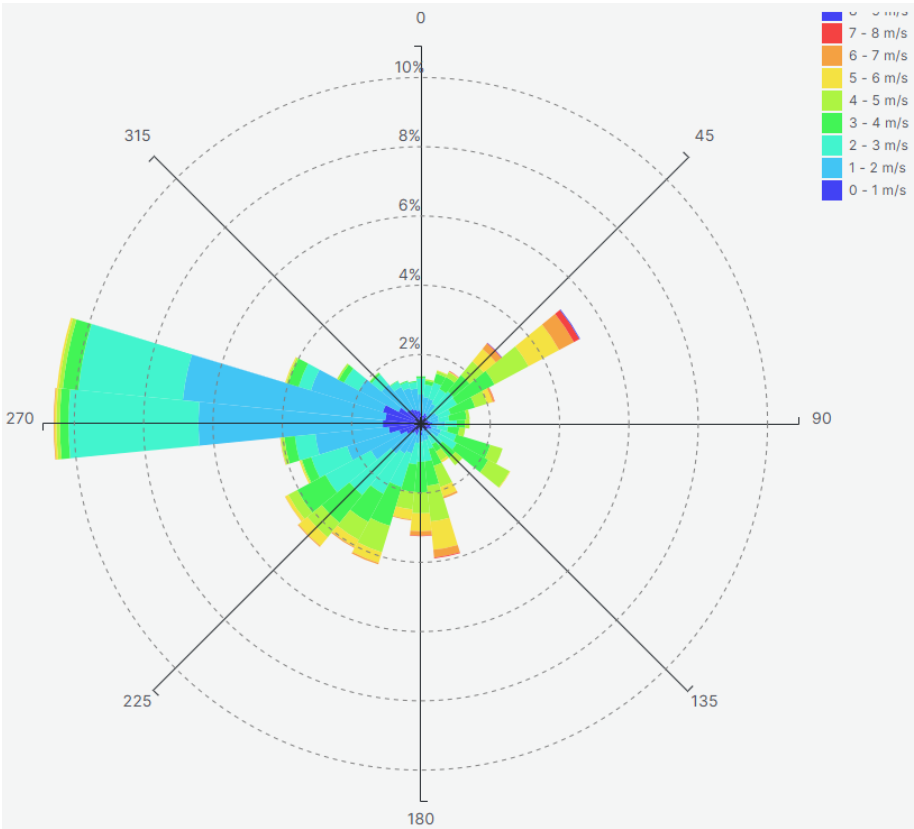


Figure 31 October 2024 Wind Rose

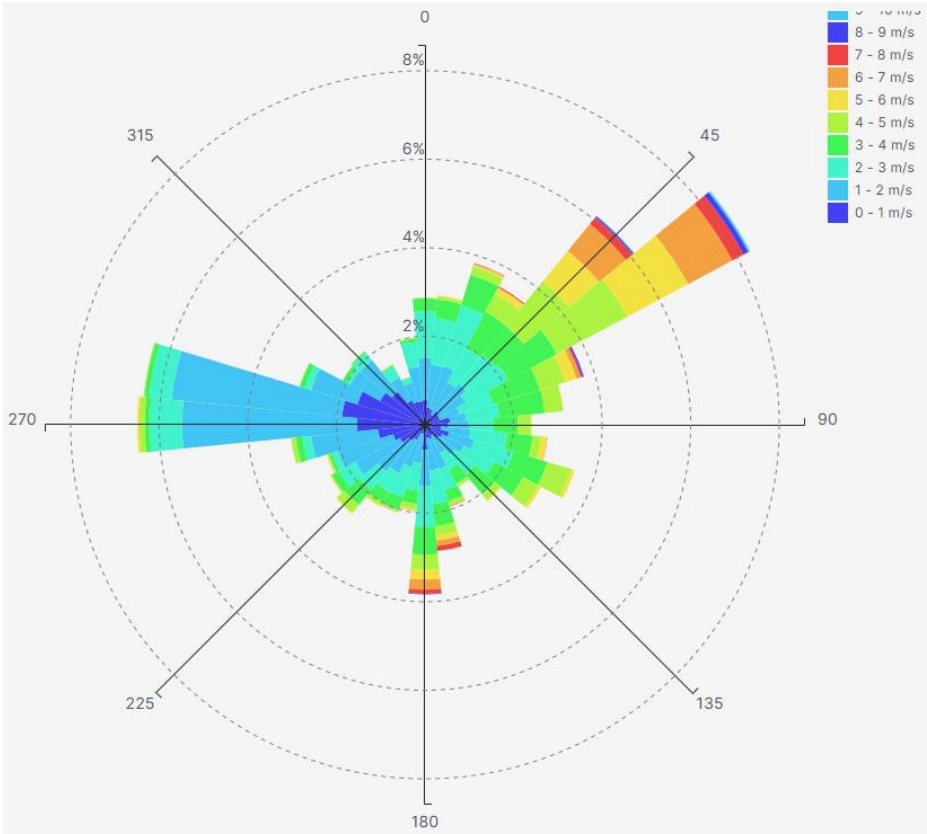


Figure 292 November 2024 Wind Rose

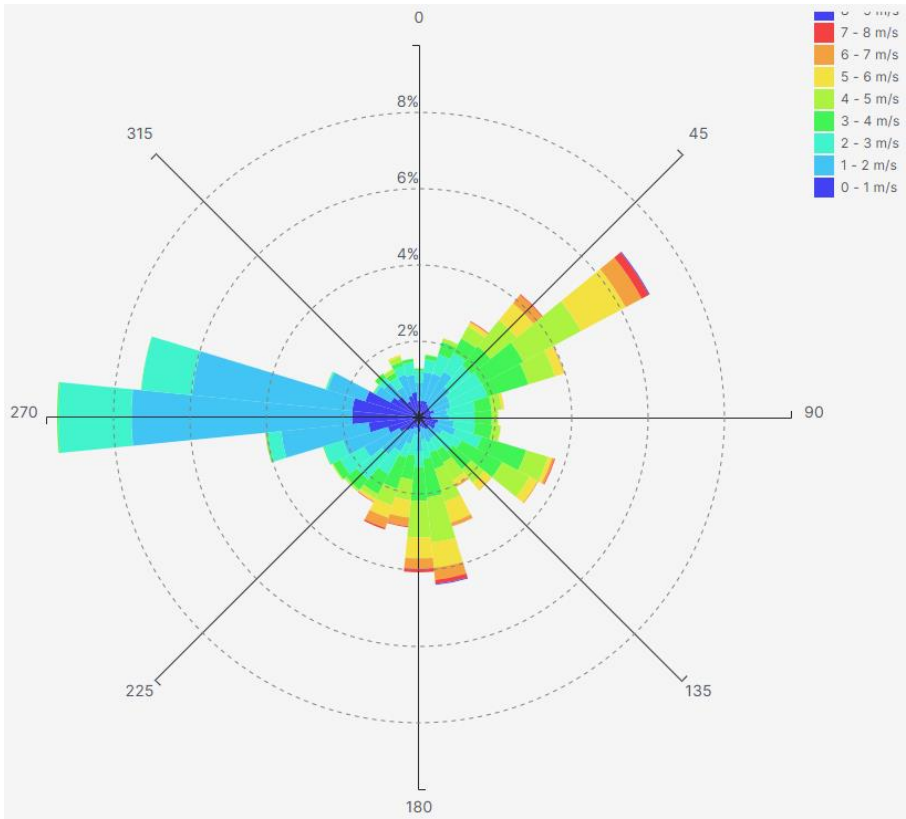


Figure 303 December 2024 Wind Rose

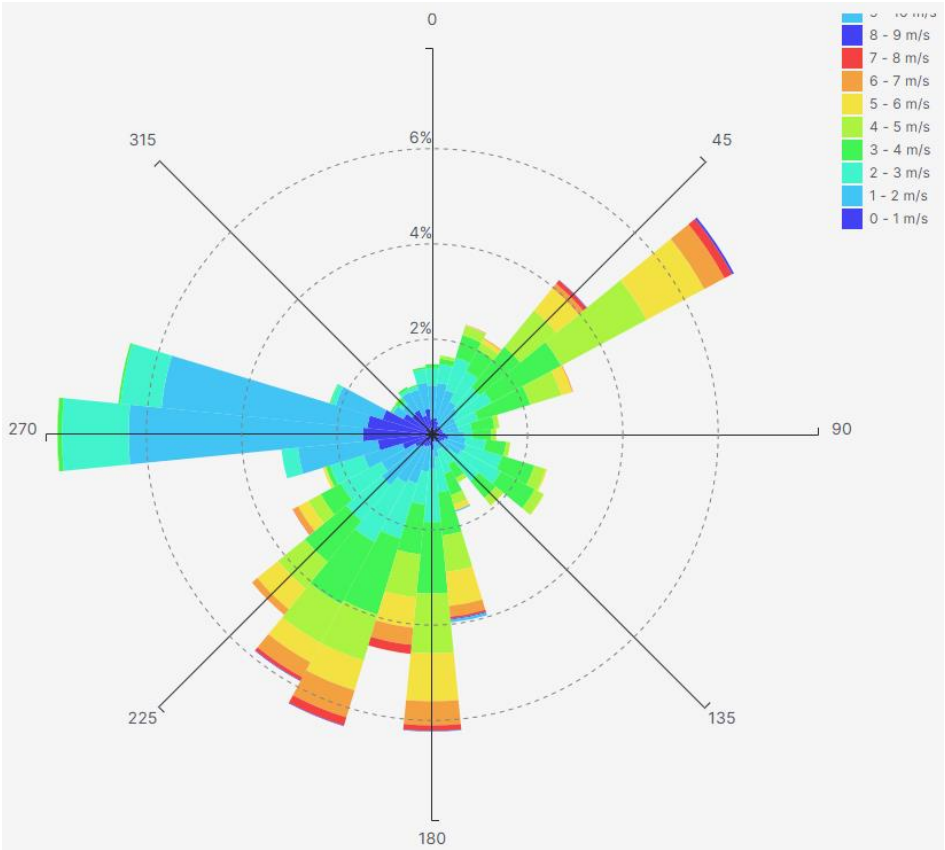


Figure 314 January 2025 Wind Rose

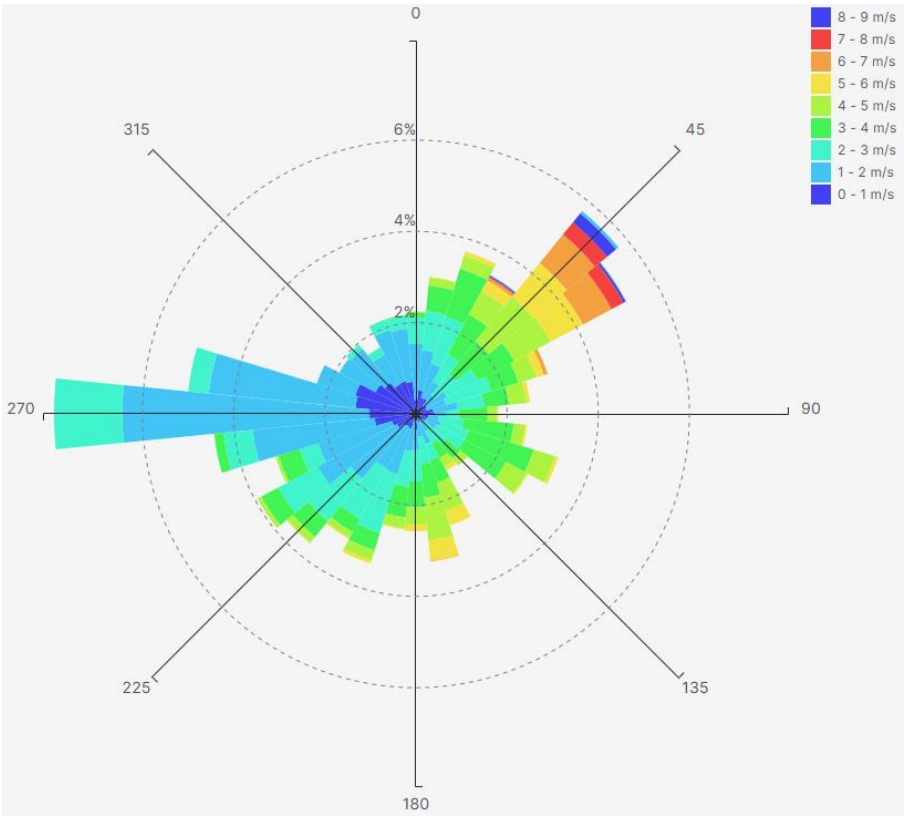


Figure 325 February 2025 Wind Rose

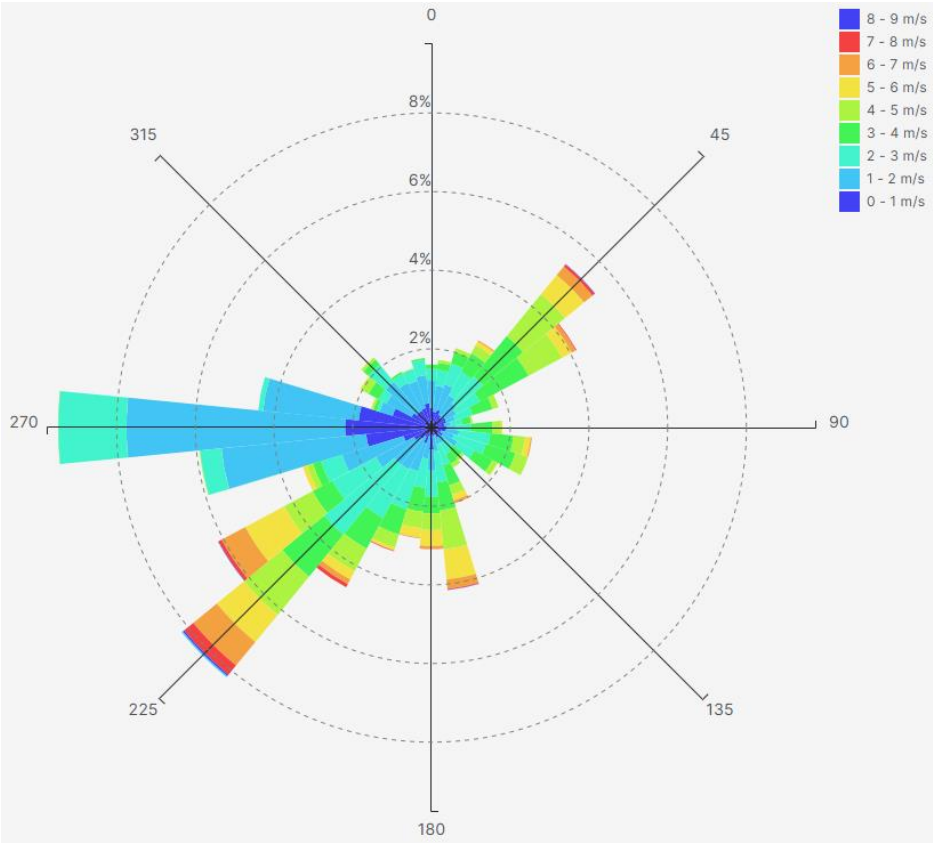


Figure 336 March 2025 Wind Rose

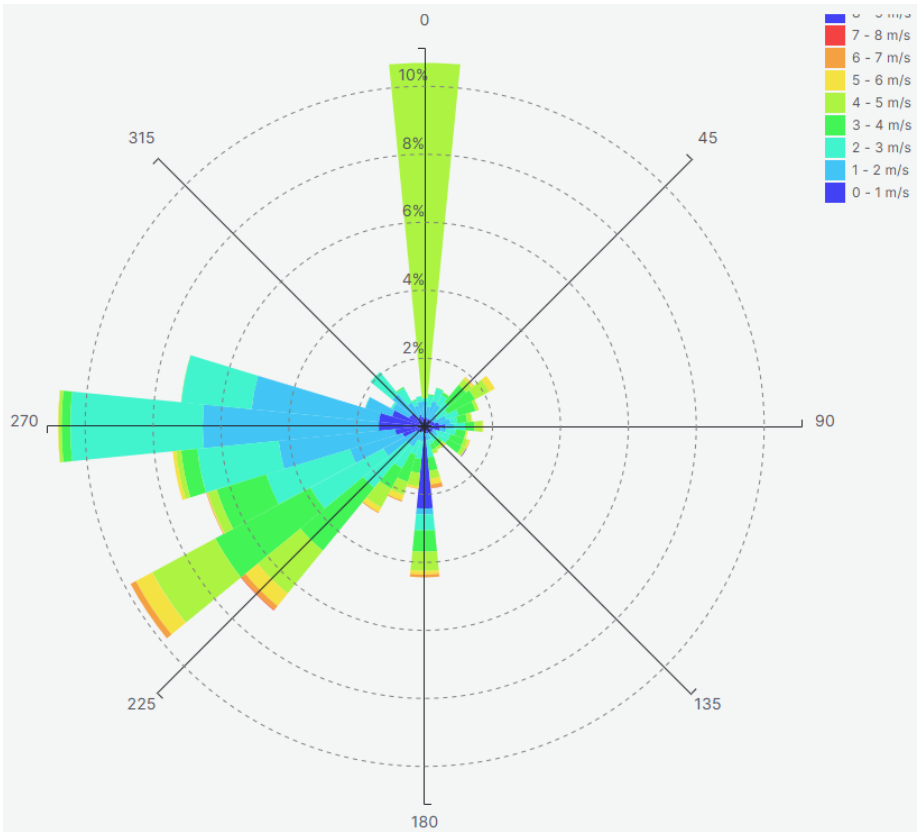


Figure 347 April 2025 Wind Rose

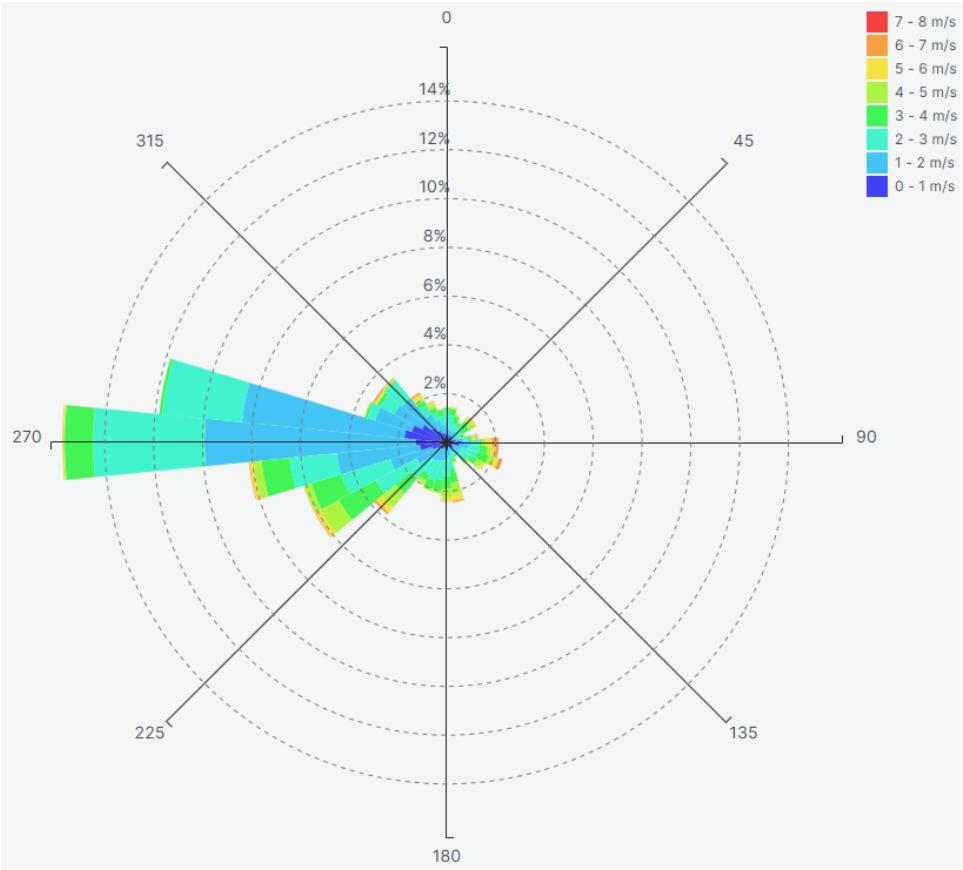


Figure 358 May 2025 Wind Rose

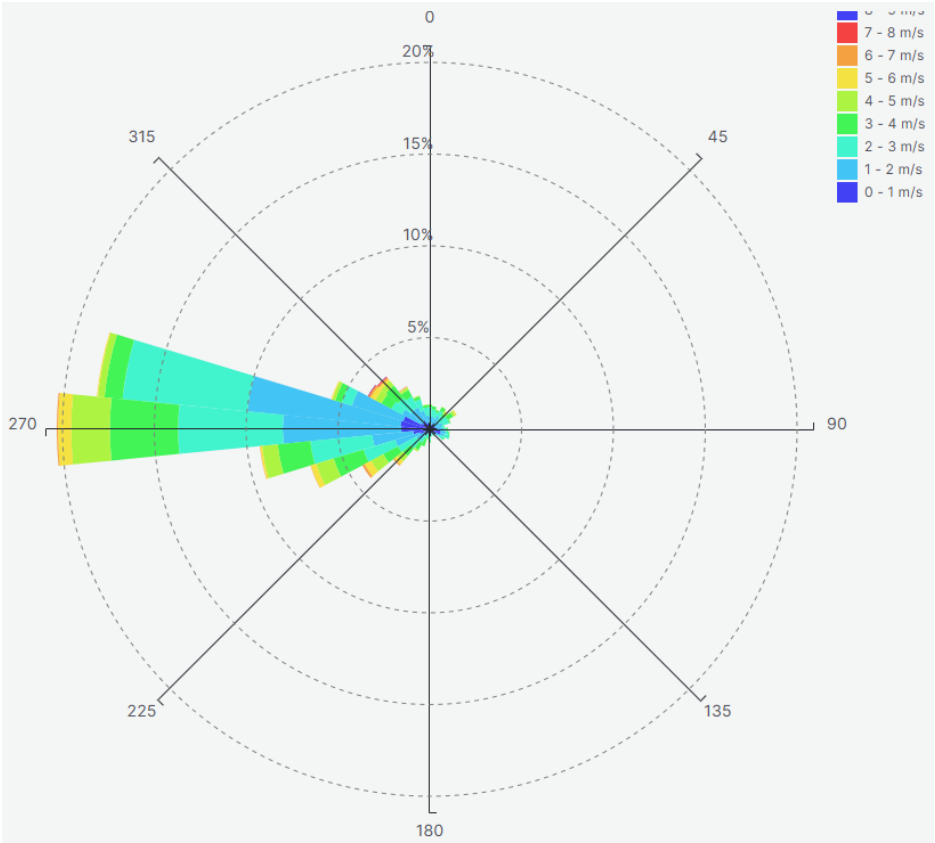


Figure 369 June 2025 Wind Rose

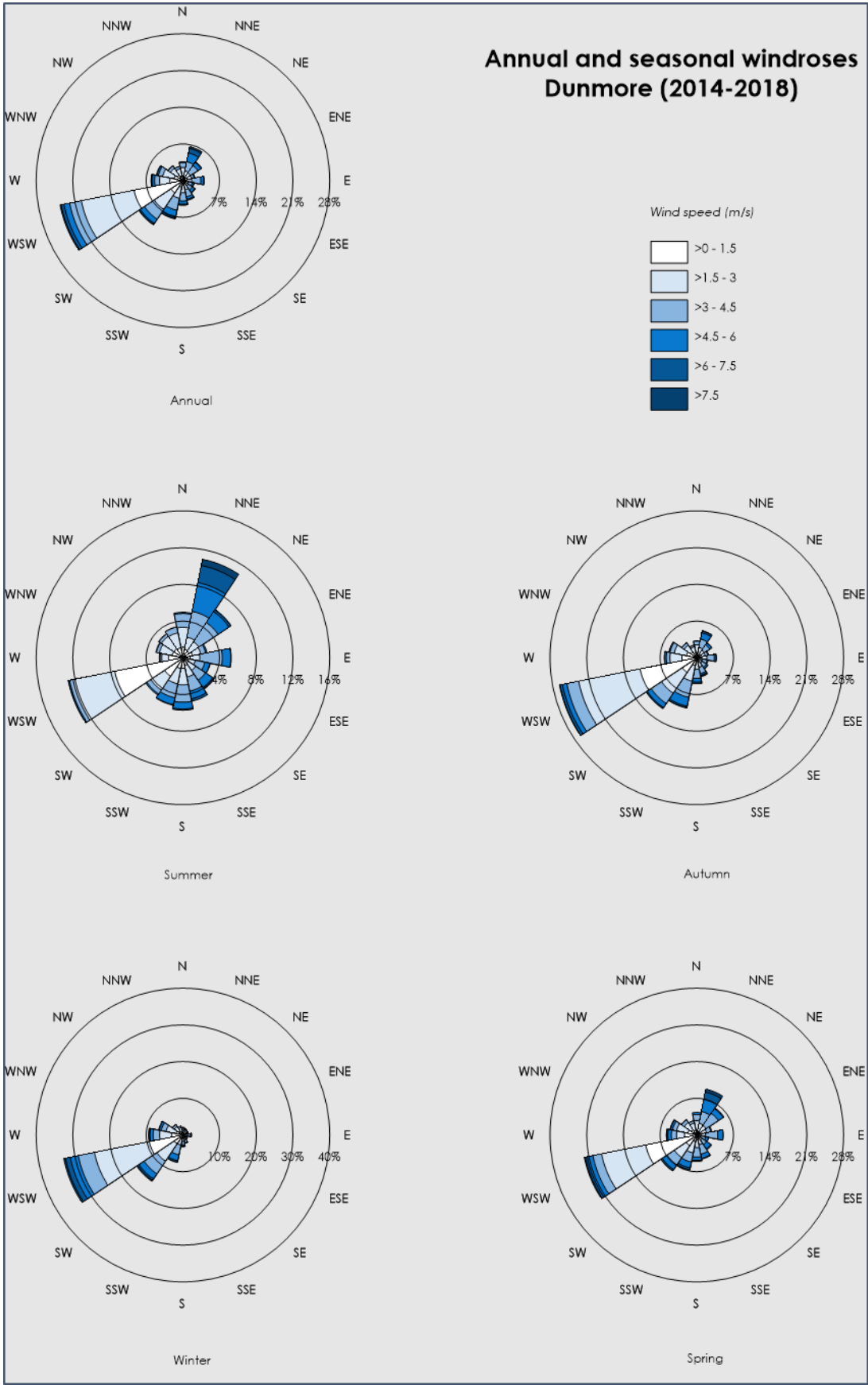


Figure 40 Dunmore Seasonal Wind Rose Data

8. Appendix B Air Quality Additional Data and Graphs

A monthly breakdown of deposited dust monitoring is shown in the Table 30 below. Dominant wind directions and production data are also shown within Table 30.

Table 30 Detail Summary of Historical Dust Data

Month	DD2 grams/m ² /month		DD5 grams/m ² /month		DD6 grams/m ² /month		DD7b/10 grams/m ² /month		Deposited Dust Goal	Production Tonnes
	Insoluble Solids	Ash	Insoluble Solids	Ash	Insoluble Solids	Ash	Insoluble Solids	Ash		
FY07 Average	3.68	1.9	3.3	2.1	5.75	3.36	3.9	1.92	4	
FY08 Average	2.97	1.84	2.88	1.66	4.23	2.43	4.31	2.44	4	
FY09 Average	3.07	1.98	3.79	1.94	3.83	2.87	5.55	3.17	4	
FY10 Average	5.29	3.3	3.42	2.5	4.88	2.96	2.71	1.66	4	
FY11 Average	6.16	3.68	3.42	1.99	3.92	2.47	3.15	2.33	4	
FY12 Average	5.51	2.82	3.09	1.82	3.17	2.32	2.53	1.6	4	
FY13 Average	4.19	2.19	3.26	1.84	3.7	2.48	2.75	1.81	4	
FY14 Average	2.21	1.42	3.63	1.76	2.67	1.58	3.36	2.36	4	
FY15 Average	3.57	1.77	2.55	1.46	3.94	2	3.2	2	4	
FY16 Average	1.85	1.19	2.59	1.44	2.55	1.55	2.66	1.66	4	
FY17 Average	2.28	1.56	2.67	1.77	3.31	1.68	2.01	1.30	4	
FY18 Average	2.36	1.65	2.32	1.78	2.71	1.88	2.84	1.79	4	
FY19 Average	3.66	1.87	3.1	1.9	3.03	1.94	2.81	1.59	4	
FY20 Average	3.59	2.11	3.06	1.82	3.49	2.18	3.16	1.98	4	
FY21 Average	1.94	1.12	2.44	1.34	2.00	1.08	1.85	1.11	4	
FY22 Average	1.25	0.65	2.05	1.13	1.79	1.05	1.64	0.85	4	
FY23 Average	2.39	1.39	1.86	1.19	1.69	1.12	1.32	0.90	4	
FY24 Average	1.86	0.81	2.49	1.48	1.54	0.94	1.93	0.73	4	
FY25 Average	1.59	0.75	5.16	1.93	1.37	0.99	2.03	0.95	4	
Jul-2024	0.91	0.50	1.47	1.30	0.76	0.50	0.79	0.54	4	18,026
Aug-2024	1.23	0.53	3.35	1.47	1.02	0.63	1.46	0.97	4	18,873
Sep-2024	3.00	0.29	2.52	0.60	1.02	0.63	3.83	0.16	4	22,106
Oct-2024	1.93	0.82	4.67	1.42	1.65	1.24	1.02	0.99	4	22,210
Nov-2024	2.20	1.72	2.51	2.47	1.56	2.94	1.89	1.49	4	20,202
Dec-2024	4.77	1.92	17.28	3.11	2.99	1.24	6.43	2.18	4	15,048
Jan-2025	1.19	1.22	10.54	3.56	2.36	1.35	1.80	1.32	4	11,172
Feb-2025	1.09	0.49	3.29	1.09	1.62	0.71	3.03	1.21	4	13,661
Mar-2025	1.12	0.57	3.93	1.24	1.20	1.16	0.87	0.67	4	14,191
Apr-2025	0.67	0.40	3.06	1.83	0.71	0.65	0.63	0.57	4	12,298
May-2025	0.58	0.30	8.68	4.72	0.68	0.35	1.76	0.86	4	22,123
Jun-2025	0.40	0.24	0.67	0.39	0.86	0.48	0.86	0.41	4	16,935
FY25 Average	1.59	0.75	5.16	1.93	1.37	0.99	2.03	0.95	4	206,844

A detailed breakdown of the particulate monitoring via the HVAS can be seen in Table 31 below.

Table 301 Detailed Summary of PM₁₀ Monitoring Data

Date	Sample Daily Average (µg/m ³)	Short Term Criteria 24-hr (50µg/m ³)	Long Term Criteria Annual (30µg/m ³)	Progressive Annual Average (µg/m ³)
1/07/2024	6.47	50	30	5.66
7/07/2024	6.59	50	30	5.63
13/07/2024	4.26	50	30	5.70
19/07/2024	13.16	50	30	6.00
25/07/2024	34.07	50	30	6.77
31/07/2024	34.37	50	30	7.69
6/08/2024	6.09	50	30	7.79
12/08/2024	7.83	50	30	7.84
18/08/2024	12.85	50	30	7.54
24/08/2024	12.15	50	30	7.87
30/08/2024	34.06	50	30	8.76
5/09/2024	47.79	50	30	9.94
11/09/2024	18.04	50	30	12.05
17/09/2024	12.54	50	30	12.06
23/09/2024	13.68	50	30	12.11
29/09/2024	13.11	50	30	12.14
5/10/2024	12.32	50	30	12.14
11/10/2024	32.92	50	30	12.67
17/10/2024		50	30	12.67
23/10/2024		50	30	12.67
29/10/2024	37.34	50	30	13.29
4/11/2024	36.66	50	30	13.86
10/11/2024	29.7	50	30	14.24
17/11/2024	12.19	50	30	14.19
25/11/2024	27.14	50	30	14.48
30/11/2024	13.54	50	30	14.46
6/12/2024	14.96	50	30	14.47
12/12/2024	37.17	50	30	14.96
18/12/2024	24.22	50	30	16.01
24/12/2024		50	30	16.01
30/12/2024	14.91	50	30	15.99
5/01/2025	22.19	50	30	16.11
12/01/2025	20.24	50	30	16.19
18/01/2025	13.89	50	30	16.15
24/01/2025	10.68	50	30	16.05
30/01/2025	12.77	50	30	15.99
5/02/2025	21.93	50	30	16.09
11/02/2025	11.09	50	30	16.01
17/02/2025	8.49	50	30	15.87
23/02/2025	14.96	50	30	15.98
1/03/2025	5.4	50	30	15.68

Date	Sample Daily Average ($\mu\text{g}/\text{m}^3$)	Short Term Criteria 24-hr ($50\mu\text{g}/\text{m}^3$)	Long Term Criteria Annual ($30\mu\text{g}/\text{m}^3$)	Progressive Annual Average ($\mu\text{g}/\text{m}^3$)
7/03/2025	7.36	50	30	15.68
13/03/2025	13.3	50	30	15.68
19/03/2025	15.97	50	30	15.51
22/03/2025	9.09	50	30	15.41
23/03/2025	24.17	50	30	15.55
3/04/2025	37.95	50	30	15.89
6/04/2025	27.05	50	30	16.06
12/04/2025	10.02	50	30	15.97
15/04/2025	22.72	50	30	16.07
18/04/2025	12.22	50	30	16.01
21/04/2025	11.45	50	30	15.95
28/04/2025	26.39	50	30	16.10
5/05/2025	12.69	50	30	16.05
11/05/2025	8.48	50	30	15.95
18/05/2025	8.01	50	30	15.84
24/05/2025	6.12	50	30	15.71
30/05/2025	8.07	50	30	15.61
5/06/2025	7	50	30	15.50
11/06/2025	6.05	50	30	15.38
17/06/2025	8.6	50	30	15.37
23/06/2025	15.48	50	30	15.50
29/06/2025	8.24	50	30	15.43



9. Appendix C Annual Noise Monitoring Compliance Report

Annual Noise Monitoring Assessment 2024

Dunmore Lakes Sand Project
Dunmore, NSW
August 2024



Document Information

Annual Noise Monitoring Assessment

Dunmore Lakes Sand Project

Dunmore, NSW

August, 2024

Prepared for: Boral Resources (NSW) Pty Ltd

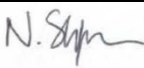
Prepared by: Muller Acoustic Consulting Pty Ltd

PO Box 678, Kotara NSW 2289

ABN: 36 602 225 132

P: +61 2 4920 1833

www.mulleracoustic.com

DOCUMENT ID	DATE	PREPARED	SIGNED	REVIEWED	SIGNED
MAC180747-11RP2	13 September 2024	Nicholas Shipman		Rod Linnett	

DISCLAIMER

All documents produced by Muller Acoustic Consulting Pty Ltd (MAC) are prepared for a particular client's requirements and are based on a specific scope, circumstances and limitations derived between MAC and the client. Information and/or report(s) prepared by MAC may not be suitable for uses other than the original intended objective. No parties other than the client should use or reproduce any information and/or report(s) without obtaining permission from MAC. Any information and/or documents prepared by MAC is not to be reproduced, presented or reviewed except in full.

CONTENTS

1	INTRODUCTION	5
1.1	LOCALITY	6
2	NOISE CRITERIA	9
2.1	DEVELOPMENT CONSENT	9
2.2	NOISE MANAGEMENT PLAN	9
2.3	ENVIRONMENTAL PROTECTION LICENCE	11
3	METHODOLOGY	13
3.1	ASSESSMENT METHODOLOGY	13
4	RESULTS	15
4.1	PREVAILING METEOROLOGICAL CONDITIONS	15
4.2	ASSESSMENT RESULTS – LOCATION DN-6	17
4.3	ASSESSMENT RESULTS – LOCATION DN-7	18
4.4	ASSESSMENT RESULTS – LOCATION DN-8	19
4.5	ASSESSMENT RESULTS – LOCATION DN-9	20
4.6	ASSESSMENT RESULTS – LOCATION DN-10	21
4.7	ASSESSMENT RESULTS – LOCATION DN-11	22
4.8	ASSESSMENT RESULTS – LOCATION DN-12	23
4.9	ASSESSMENT RESULTS – LOCATION DN-13	24
5	DISCUSSION	25
5.1	DISCUSSION OF RESULTS - LOCATION DN-6	25
5.2	DISCUSSION OF RESULTS - LOCATION DN-7	25
5.3	DISCUSSION OF RESULTS - LOCATION DN-8	25
5.4	DISCUSSION OF RESULTS - LOCATION DN-9	25
5.5	DISCUSSION OF RESULTS - LOCATION DN-10	26
5.6	DISCUSSION OF RESULTS - LOCATION DN-11	26
5.7	DISCUSSION OF RESULTS - LOCATION DN-12	26
5.8	DISCUSSION OF RESULTS - LOCATION DN-13	26
6	CONCLUSION	27

APPENDIX A – GLOSSARY OF TERMS

This page has been intentionally left blank

1 Introduction

Muller Acoustic Consulting Pty Ltd (MAC) has completed a Noise Monitoring Assessment (NMA) on behalf of Project Location for Dunmore Lakes Sand Project (DLSP), at Dunmore, NSW.

The monitoring has been conducted in accordance with the Dunmore Lakes Sand Project Noise Management Plan V7 (NMP, 2021) and in general accordance with the Noise Policy for Industry (NPI). This assessment has been undertaken during August 2024 and forms the annual noise monitoring program to address conditions outlined in the Development Consent (DA 195-8-2004) with the commencement of Stage 5A. This report summarises the operator-attended noise monitoring results measured at eight receivers in comparison to the relevant noise limits contained in the Development Consent, EPL and NMP.

The assessment has been conducted in accordance with the following documents:

- NSW Environment Protection Authority (EPA), Noise Policy for Industry (NPI), 2017;
- NSW Environment Protection Authority (EPA's), Approved Methods for the measurement and analysis of environmental noise in NSW, 2022;
- Dunmore Lakes Sand Extraction Project – Modification 2, Development Consent (DC), (DA #195-8-2004) November 2020;
- Dunmore Lakes Sand Project Noise Management Plan V7 (NMP), 2021;
- Dunmore Lakes Sand Quarry Environmental Protection Licence (EPL), (EPL #11147);
- Discussion Paper - Validation of Inversion Strength Estimation Method (EPA) 2014; and
- Standards Australia AS 1055:2018 - Acoustics - Description and measurement of environmental noise.

A glossary of terms, definitions and abbreviations used in this report is provided in **Appendix A**.

1.1 Locality

DLSP is located at Dunmore near Shellharbour, NSW. Receivers in the locality surrounding DLSP are primarily rural and residential. Highway traffic is a dominant noise source for receivers as they are situated within 500m of the Princes Highway. The representative monitoring locations with respect to DLSP are presented in the locality plan in **Figure 1**.



FIGURE 1
LOCALITY PLAN
MAC180747

Dunmore Lakes Sand Project, Dunmore

KEY

- Receiver Locations
- Weather Balloon Locations
- Site Boundary

0 100 200 300 400 500 m



This page has been intentionally left blank

2 Noise Criteria

2.1 Development Consent

Condition 13 of the DLSP Development Consent (DA #195-8-2004) November 2020, outlines the applicable noise criteria and conditions for residential receivers surrounding the operation. The criteria outlined in the DC is reproduced below in **Table 1**.

Table 1 Development Consent Criteria				
Receiver Location ¹	Day	Evening	Night	Morning Shoulder
	(7am - 6pm)	(6pm - 10pm)	(10pm - 12am)	(6am - 7am)
	dB LAeq(15min)	dB LAeq(15min)	dB LAeq(15min)	dB LAeq(15min)
Dunmore Village residences – 31 Shellharbour Road	49	44	41	47
R20	49	44	38	47
R3, R11, R12, R13, R14, R15, R16, R17, R18, 79 Fig Hill Lane	48	43	38	48
R19	47	43	38	46
R4, R5, R6, R7, R8, R9, R10	47	43	38	43
Renton (183 James Road, Dunmore)	46	43	37	46
All other residences	40	35	35	35

Note 1: Referenced from DLSP DC Table 1 and DLSP NMPv7 Table 7.

2.2 Noise Management Plan

Condition 4.1.2 of the DLSP Noise Management Plan v7, 2021, outlines additional applicable noise criteria and conditions for residential receivers surrounding the operation. The criteria outlined in the NMP is reproduced below in **Table 2**.

Table 2 Maximum Noise Trigger Levels		
Receiver Location	Night ¹	Morning Shoulder ¹
	(10pm - 12am)	(6am - 7am)
	dB LAmax	dB LAmax
R1, R2, R3, R11, R12, R13, R14, R15, R16, R17 and R18	61	
R4, R5, R6, R7, R8, R9, R10	53	
R19	56	

Note 1: Referenced from DLSP NMPv7 Table 8.

Additional relevant noise conditions in relation to the attended monitoring program within the Noise Management Plan v7, 2021 have been reproduced below.

6.1.3 Attended Monitoring Program

Attended compliance noise monitoring will continue to be undertaken on an annual basis. Additional monitoring will also be undertaken during the first month of operation of each new extraction stage (i.e. Stages 5A and 5B). Monitoring must be conducted for one 15-minute period at each of the eight nominated locations during the morning shoulder (6.00 am – 7.00 am) and for two consecutive 15-minute periods at each of the eight nominated locations during the day (7.00 am – 6.00 pm).

The monitoring program will be reviewed as required so that noise impacts on privately-owned properties are suitably assessed.

In circumstances where the attended monitoring was affected by adverse weather conditions (i.e. when wind at microphone height exceeds 5 m/s or during rain), an additional set of monitoring will be conducted at the earliest opportunity. The operator must use a hand-held anemometer to determine wind speed at microphone height during attended monitoring.

Monitoring will be carried out in response to any sustained complaint during the assessment period in which the complaints occur.

6.1.4 Attended Monitoring Regulatory Requirements

Attended monitoring must be carried out in accordance with the regulatory requirements for reviewing performance as documented in the NPfI. The requirements relating to the following will be observed:

- *Monitoring locations for collection of representative data;*
- *Meteorological conditions during which noise monitoring shall be excluded (i.e. when wind at microphone height exceeds 5 m/s, or during rain);*
- *Instrumentation and conformity to International and Australian Standards; and*
- *Modifications to data, including penalties for modifying factors such as low-frequency noise.*

2.3 Environmental Protection Licence

Section L3 of the DLSP Environmental Protection Licence (EPL #11147), outlines the applicable noise limits for residential receivers surrounding the operation. The criteria outlined in the EPL is reproduced below in **Table 3** along with relevant noise conditions.

L3.1 Noise from the premises must not exceed the following limits:

Table 3 EPL Noise Limits				
Location	Day (7am - 6pm)	Evening (6pm - 10pm)	Night (10pm - 6am)	Morning Shoulder (6am - 7am)
	dB LAeq(15min)	dB LAeq(15min)	dB LAeq(15min)	dB LAeq(15min)
Renton (DN-6)	46	43	37	46
Dunmore Village (DN-7)	49	44	41	47
Stocker (DN-8)	49	44	38	47

Note: The night-time noise limit for Dunmore Village was determined on the basis of predicted noise levels that would be attained after a noise reduction of 8 dB(A) for the loader and/or loading area.

L3.2 For the purposes of condition L3.1:

- *Shoulder is the period 6am to 7am Monday to Saturday;*
- *Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6 pm Sundays and Public holidays;*
- *Evening is defined as the period from 6pm to 10pm; and*
- *Night is defined as the period from 10pm to 6am.*

L3.3 Noise from the premises is to be measured at the most affected point on or within the residential boundary or at the most affected point within 30m of the dwelling (rural situations) where the dwelling is more than 30m from the boundary to determine compliance with the LAeq(15 minute) noise limit in this condition.

The modification factors presented in Section 4 of the NSW Industrial Noise Policy must also be applied to the measured noise levels where applicable.

L3.4 The noise emission limits identified in this condition apply under meteorological conditions of:

- *wind speeds up to 3 m/s at 10metres above the ground level; or*
- *temperature inversions conditions of up to 6oC/100m and wind speeds up to 2m/s at 10 metres above ground level.*

This page has been intentionally left blank

3 Methodology

3.1 Assessment Methodology

The attended noise measurements were conducted in general accordance with the procedures described in Standards Australia AS 1055:2018, "Acoustics - Description and Measurement of Environmental Noise" and the DLSP NMP. Noise measurements of two 15-minutes in duration during the day period and one 15-minute duration during the remaining periods were conducted at eight locations (DN-6, DN-7, DN-8, DN-9, DN-10, DN-11, DN-12, DN-13) using Svanter Type 1, 971 noise analysers between Tuesday 20 August 2024 and Thursday 22 August 2024 to satisfy the relevant requirements. All acoustic instrumentation used carries appropriate and current NATA (or manufacturer) calibration certificates with records of all calibrations maintained by MAC as per Approved Methods for the measurement and analysis of environmental noise in NSW (EPA, 2022) and complies with AS/NZS IEC 61672.1-2019-Electroacoustics - Sound level meters - Specifications. Calibration of all instrumentation was checked prior to and following measurements. Drift in calibration did not exceed ± 0.5 dBA.

To understand meteorological conditions during calm conditions, direct measurement of temperature profile was undertaken at Trevethan Reserve, Minnamurra on Tuesday 20 August 2024 and at Fuller Drive, Dunmore on Wednesday 21 August 2024, at 2m above ground level and at 50m above ground level using a weather balloon.

The results of the temperature measurements were used to determine the temperature lapse rate in general accordance with the Validation of Inversion Strength Estimation Method (2014). These measurements, in combination with the on-site weather station provide a reference to validate the relevant meteorological conditions under which compliance is assessed.

Extraneous noise sources were excluded from the analysis to determine the dB LAeq(15min) DSLP noise contribution for comparison against the relevant criteria. In the event of quarry attributed noise being above criteria, prevailing meteorological conditions for the monitoring period are sourced from the onsite meteorological station and analysed in accordance with Fact Sheet A4 of the NPI to determine the stability category present at the time of each attended measurement.

Where the quarry is inaudible, the contribution is estimated to be at least 10dBA below the ambient noise level.

This page has been intentionally left blank

4 Results

4.1 Prevailing Meteorological Conditions

A summary of prevailing meteorological conditions is presented in **Table 4**.

Table 4 - Prevailing Meteorological Conditions									
Date/Time	Boral Dunmore Onsite MET Station		Operator Measured Weather Monitoring						
	Wind Direction	Wind (m/s)	1.5m WS (m/s)	1.5m WD	2m Temp °C	60m Temp °C	Delta Temp °C	Lapse Rate °C/100m2	Stability Class2
20/08/2024 19:42	ESE	0.5	0.6	N	n/a	n/a	n/a	n/a	n/a
20/08/2024 20:00	NNW	0.1	0.2	N	n/a	n/a	n/a	n/a	n/a
20/08/2024 20:26	WSW	1.5	0.2	N	n/a	n/a	n/a	n/a	n/a
20/08/2024 20:45	WSW	1.5	0.4	N	n/a	n/a	n/a	n/a	n/a
20/08/2024 21:07	E	0.7	0.1	NE	n/a	n/a	n/a	n/a	n/a
20/08/2024 21:22	ENE	0.9	0.2	N	n/a	n/a	n/a	n/a	n/a
20/08/2024 21:31	E	1	0.5	NE	n/a	n/a	n/a	n/a	n/a
20/08/2024 22:24	NNW	0.8	0.5	NE	15	15	0	2.1	F
20/08/2024 22:25	NNW	0.8	0.1	N	14	16	2	2.2	F
20/08/2024 22:42	NNW	2.4	0.1	N	15	16	1	2.9	F
20/08/2024 22:49	NNW	2.7	0.5	W	15	17	2	2.4	F
20/08/2024 23:13	NNW	2.8	0.5	W	n/a	n/a	n/a	n/a	n/a
20/08/2024 23:18	NNW	2.8	0.3	W	n/a	n/a	n/a	n/a	n/a
20/08/2024 23:35	N	1.9	0.3	W	n/a	n/a	n/a	n/a	n/a
20/08/2024 23:36	N	1.9	0.5	W	n/a	n/a	n/a	n/a	n/a
21/08/2024 06:05	WNW	0.7	0.1	NW	11	12	1	1.6	F
21/08/2024 06:15	NW	0.6	0.1	N	11	12	1	1.5	E
21/08/2024 06:31	W	0.6	0.1	NW	11	12	1	1.5	E
21/08/2024 06:32	W	0.6	0.1	N	11	12	1	1.5	E
21/08/2024 07:00	WNW	0.3	0.1	N	12	12	0	1.5	F
21/08/2024 07:05	W	0.7	0.1	NW	12	12	0	1.4	E
21/08/2024 07:15	W	0.9	0.1	N	12	13	1	1.2	F
21/08/2024 07:20	W	0.9	0.1	NW	12	13	1	1	E
21/08/2024 07:33	WSW	1	0.1	N	12	13	1	0.8	E
21/08/2024 07:45	SW	0.5	0.1	NW	12	13	1	0.1	E
21/08/2024 07:48	SW	0.5	0.1	N	13	13	0	-0.2	E
21/08/2024 08:00	W	0.7	0.1	NW	13	13	0	1.9	E
21/08/2024 08:17	W	1.3	0.4	N	n/a	n/a	n/a	n/a	n/a
21/08/2024 08:25	W	1.4	0.1	W	n/a	n/a	n/a	n/a	n/a
21/08/2024 08:32	W	1.4	0.4	N	n/a	n/a	n/a	n/a	n/a
21/08/2024 08:40	WNW	0.9	0.5	W	n/a	n/a	n/a	n/a	n/a
21/08/2024 08:50	N	0.6	0.4	N	n/a	n/a	n/a	n/a	n/a
21/08/2024 09:05	NW	0.6	0.5	N	n/a	n/a	n/a	n/a	n/a
21/08/2024 09:23	NW	0.6	0.5	N	n/a	n/a	n/a	n/a	n/a

Table 4 - Prevailing Meteorological Conditions

Boral Dunmore Onsite MET Station			Operator Measured Weather Monitoring						
Date/Time	Wind Direction	Wind (m/s)	1.5m WS (m/s)	1.5m WD	2m Temp °C	60m Temp °C	Delta Temp °C	Lapse Rate °C/100m2	Stability Class2
21/08/2024 09:38	NE	1.3	0.5	N	n/a	n/a	n/a	n/a	n/a
22/08/2024 06:06	NE	1	0.1	W	11	14	3	5.1	G
22/08/2024 06:13	SW	1.5	0.1	N	11	14	3	5.3	G
22/08/2024 06:27	W	0.9	0.1	W	11	14	3	5.2	G
22/08/2024 06:30	W	0.9	0.1	N	11	14	3	5.4	G

Note 1: Data from on-site weather station.

Note 2: Calculated from 2m and 60m temperature.

The observed meteorological measurements were within the development consent conditions for all measurements.

4.2 Assessment Results – Location DN-6

The monitored noise level contributions and observed meteorological conditions at Location DN-6 are presented in **Table 5**.

Table 5 DN-6 – Operator Attended Noise Monitoring Results

Date	Time (hrs) ¹	Descriptor (dBA re 20µPa)					Meteorology ²	Description and SPL, dBA
		L _A max	L _A 10	L _A eq	L _A 90	L _A min		
21/08/2024	06:31 (Morning Shoulder)	68	56	54	52	49	WD: NW	Traffic 49-56
							WS: 0.1m/s	Birds 45-68
							Stab: E	Livestock <45
								DLSP inaudible
DLSP Site L _A eq(15min) Contribution								<42
DLSP Site L _A max(15min) Contribution								<42
21/08/2024	07:45 (Day)	66	55	54	51	49	WD: NW	Traffic 49-58
							WS: 0.1m/s	Birds 45-66
							Stab: E	Livestock 45-50
								Insects <45
								DLSP inaudible
DLSP Site L _A eq(15min) Contribution								<41
21/08/2024	08:00 (Day)	63	53	51	49	48	WD: NW	Traffic 45-55
							WS: 0.1m/s	Birds 45-63
							Stab: E	Livestock <45
								DLSP inaudible
DLSP Site L _A eq(15min) Contribution								<39
20/08/2024	21:07 (Evening)	66	59	55	48	42	WD: NE	Traffic 42-66
							WS: 0.1m/s	Livestock <40
							Stab: n/a	DLSP inaudible
DLSP Site L _A eq(15min) Contribution								<38
20/08/2024	22:24 (Night)	66	58	54	42	37	WD: NE	Traffic 36-66
							WS: 0.5m/s	Insects 35-40
							Stab: F	DLSP inaudible
DLSP Site L _A eq(15min) Contribution								<35
DLSP Site L _A max(15min) Contribution								<45

Note 1: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Morning Shoulder - the period from 6am to 7am; Night - the remaining periods.

Note 2: Data from on-site weather station or attended operator observations.

4.3 Assessment Results – Location DN-7

The monitored noise level contributions and observed meteorological conditions at Location DN-7 are presented in **Table 6**.

Table 6 DN-7 – Operator Attended Noise Monitoring Results

Date	Time (hrs) ¹	Descriptor (dBA re 20µPa)					Meteorology ²	Description and SPL, dBA
		L _{Amax}	L _{A10}	L _{Aeq}	L _{A90}	L _{Amin}		
21/08/2024	06:05						WD: NW	Traffic 59-71
	(Morning	71	67	65	62	59	WS: 0.1m/s	Birds <55
	Shoulder)						Stab: F	DLSP inaudible
	DLSP Site L _{Aeq} (15min) Contribution							
	DLSP Site L _{Amax} (15min) Contribution							
21/08/2024	07:05						WD: NW	Traffic 60-70
	(Day)	70	67	65	63	60	WS: 0.1m/s	Birds <60
							Stab: E	DLSP inaudible
	DLSP Site L _{Aeq} (15min) Contribution							
	DLSP Site L _{Amax} (15min) Contribution							
21/08/2024	07:20						WD: NW	Traffic 62-75
	(Day)	75	68	66	64	62	WS: 0.1m/s	Birds <60
							Stab: E	DLSP inaudible
	DLSP Site L _{Aeq} (15min) Contribution							
	DLSP Site L _{Amax} (15min) Contribution							
20/08/2024	21:31						WD: NE	Traffic 40-67
	(Evening)	67	60	56	49	40	WS: 0.5m/s	Insects <40
							Stab: n/a	DLSP inaudible
	DLSP Site L _{Aeq} (15min) Contribution							
	DLSP Site L _{Amax} (15min) Contribution							
20/08/2024	22:49						WD: W	Traffic 36-72
	(Night)	79	60	56	44	36	WS: 0.5m/s	Train 35-79
							Stab: F	Aircraft 35-48
	DLSP Site L _{Aeq} (15min) Contribution							
	DLSP Site L _{Amax} (15min) Contribution							

Note 1: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Morning Shoulder - the period from 6am to 7am; Night - the remaining periods.

Note 2: Data from on-site weather station or attended operator observations.

4.4 Assessment Results – Location DN-8

The monitored noise level contributions and observed meteorological conditions at Location DN-7 are presented in **Table 7**.

Table 7 DN-8 – Operator Attended Noise Monitoring Results

Date	Time (hrs) ¹	Descriptor (dBA re 20μPa)					Meteorology ²	Description and SPL, dBA
		L _A max	L _A 10	L _A eq	L _A 90	L _A min		
22/08/2024	06:27						WD: W	Traffic 52-83
	(Morning	83	64	64	55	52	WS: 0.1m/s	Birds 45-60
	Shoulder)						Stab: G	DLSP inaudible
	DLSP Site L _A eq(15min) Contribution							<43
DLSP Site L _A max(15min) Contribution							<43	
21/08/2024	08:25						WD: W	Traffic 44-83
	(Day)	83	68	65	48	44	WS: 0.1m/s	Birds 40-62
							Stab: n/a	DLSP inaudible
	DLSP Site L _A eq(15min) Contribution							<38
21/08/2024	08:40						WD: W	Traffic 43-87
	(Day)	87	70	66	48	43	WS: 0.5m/s	Birds 40-65
							Stab: n/a	DLSP inaudible
	DLSP Site L _A eq(15min) Contribution							<38
20/08/2024	21:22						WD: N	Traffic 41-78
	(Evening)	78	53	55	45	41	WS: 0.2m/s	Insects <41
							Stab: n/a	DLSP inaudible
	DLSP Site L _A eq(15min) Contribution							<35
20/08/2024	23:13						WD: W	Traffic 33-69
	(Night)	69	51	50	37	33	WS: 0.5m/s	Insects 30-35
							Stab: n/a	DLSP inaudible
	DLSP Site L _A eq(15min) Contribution							<35
DLSP Site L _A max(15min) Contribution							<45	

Note 1: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Morning Shoulder - the period from 6am to 7am; Night - the remaining periods.

Note 2: Data from on-site weather station or attended operator observations.

4.5 Assessment Results – Location DN-9

The monitored noise level contributions and observed meteorological conditions at Location DN-7 are presented in **Table 8**.

Table 8 DN-9 – Operator Attended Noise Monitoring Results

Date	Time (hrs) ¹	Descriptor (dBA re 20μPa)					Meteorology ²	Description and SPL, dBA
		L _A max	L _A 10	L _A eq	L _A 90	L _A min		
22/08/2024	06:06						WD: W	Traffic 49-55
	(Morning	69	55	53	50	47	WS: 0.1m/s	Birds 45-69
	Shoulder)						Stab: G	DLSP inaudible
	DLSP Site L _A eq(15min) Contribution							<40
DLSP Site L _A max(15min) Contribution							<40	
21/08/2024	09:23						WD: N	Birds 47-72
	(Day)	72	55	53	50	46	WS: 0.5m/s	Traffic 47-58
							Stab: n/a	DLSP inaudible
	DLSP Site L _A eq(15min) Contribution							<40
21/08/2024	09:38						WD: N	Birds 47-65
	(Day)	65	55	53	49	46	WS: 0.5m/s	Traffic 47-62
							Stab: n/a	DLSP inaudible
	DLSP Site L _A eq(15min) Contribution							<39
20/08/2024	21:04						WD: N	Traffic 39-53
	(Evening)	53	48	45	42	39	WS: 0.2m/s	Birds 39-46
							Stab: n/a	Aircraft 39-44
	DLSP Site L _A eq(15min) Contribution							<35
20/08/2024	23:36						WD: W	Traffic 32-61
	(Night)	61	52	47	35	32	WS: 0.5m/s	Insects 30-35
							Stab: n/a	DLSP inaudible
	DLSP Site L _A eq(15min) Contribution							<35
DLSP Site L _A max(15min) Contribution							<45	

Note 1: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Morning Shoulder - the period from 6am to 7am; Night - the remaining periods.

Note 2: Data from on-site weather station or attended operator observations.

4.6 Assessment Results – Location DN-10

The monitored noise level contributions and observed meteorological conditions at Location DN-7 are presented in **Table 9**.

Table 9 DN-10 – Operator Attended Noise Monitoring Results

Date	Time (hrs) ¹	Descriptor (dBA re 20μPa)					Meteorology ²	Description and SPL, dBA
		L _A max	L _A 10	L _A eq	L _A 90	L _A min		
22/08/2024	06:30						WD: N	Traffic 46-78
	(Morning	78	55	55	48	46	WS: 0.1m/s	Birds 46-58
	Shoulder)						Stab: G	DLSP inaudible
	DLSP Site L _A eq(15min) Contribution							<38
DLSP Site L _A max(15min) Contribution							<38	
21/08/2024	08:50						WD: N	Traffic 40-58
	(Day)	63	47	46	42	40	WS: 0.4m/s	Birds 40-63
							Stab: n/a	DLSP inaudible
	DLSP Site L _A eq(15min) Contribution							<35
21/08/2024	09:05						WD: N	Traffic 40-76
	(Day)	76	50	52	42	40	WS: 0.5m/s	Birds 40-60
							Stab: n/a	DLSP inaudible
	DLSP Site L _A eq(15min) Contribution							<35
20/08/2024	20:45						WD: N	Traffic 37-55
	(Evening)	55	47	45	40	37	WS: 0.4m/s	Birds <37
							Stab: n/a	DLSP inaudible
	DLSP Site L _A eq(15min) Contribution							<35
20/08/2024	23:35						WD: W	Traffic 32-62
	(Night)	62	44	41	34	32	WS: 0.3m/s	Birds 32-38
							Stab: n/a	DLSP inaudible
	DLSP Site L _A eq(15min) Contribution							<35
DLSP Site L _A max(15min) Contribution							<45	

Note 1: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Morning Shoulder - the period from 6am to 7am; Night - the remaining periods.

Note 2: Data from on-site weather station or attended operator observations.

4.7 Assessment Results – Location DN-11

The monitored noise level contributions and observed meteorological conditions at Location DN-7 are presented in **Table 10**.

Table 10 DN-11 – Operator Attended Noise Monitoring Results

Date	Time (hrs) ¹	Descriptor (dBA re 20µPa)					Meteorology ²	Description and SPL, dBA
		L _A max	L _A 10	L _A eq	L _A 90	L _A min		
22/08/2024	06:13						WD: N	Traffic 49-58
	(Morning	71	59	57	52	49	WS: 0.1m/s	Birds 49-71
	Shoulder)						Stab: G	DLSP inaudible
	DLSP Site L _A eq(15min) Contribution							<42
DLSP Site L _A max(15min) Contribution							<42	
21/08/2024	08:17						WD: N	Birds 48-56
	(Day)	66	56	54	51	48	WS: 0.4m/s	Traffic 48-66
							Stab: n/a	DLSP inaudible
	DLSP Site L _A eq(15min) Contribution							<41
21/08/2024	08:32						WD: N	Birds 48-56
	(Day)	72	55	54	50	47	WS: 0.4m/s	Traffic 48-72
							Stab: n/a	DLSP inaudible
	DLSP Site L _A eq(15min) Contribution							<40
20/08/2024	20:26						WD: N	Traffic 43-62
	(Evening)	62	55	52	45	41	WS: 0.2m/s	Birds 43-46
							Stab: n/a	DLSP inaudible
	DLSP Site L _A eq(15min) Contribution							<35
20/08/2024	23:18						WD: W	Traffic 33-64
	(Night)	64	52	48	35	33	WS: 0.3m/s	Birds 33-46
							Stab: n/a	DLSP inaudible
	DLSP Site L _A eq(15min) Contribution							<35
DLSP Site L _A max(15min) Contribution							<45	

Note 1: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Morning Shoulder - the period from 6am to 7am; Night - the remaining periods.

Note 2: Data from on-site weather station or attended operator observations.

4.8 Assessment Results – Location DN-12

The monitored noise level contributions and observed meteorological conditions at Location DN-7 are presented in **Table 11**.

Table 11 DN-12 – Operator Attended Noise Monitoring Results

Date	Time (hrs) ¹	Descriptor (dBA re 20µPa)					Meteorology ²	Description and SPL, dBA
		L _A max	L _A 10	L _A eq	L _A 90	L _A min		
21/08/2024	06:32 (Morning Shoulder)	85	77	71	54	48	WD: N	Traffic 48-85
							WS: 0.1m/s	Birds 48-54
							Stab: E	Train 50-68
								DLSP inaudible
DLSP Site L _A eq(15min) Contribution								<43
DLSP Site L _A max(15min) Contribution								<43
21/08/2024	07:00 (Day)	87	76	71	54	48	WD: N	Birds 51-54
							WS: 0.1m/s	Traffic 49-87
							Stab: F	Train 50-62
								DLSP inaudible
DLSP Site L _A eq(15min) Contribution								<44
21/08/2024	07:15 (Day)	84	77	72	56	52	WD: N	Traffic 52-84
							WS: 0.1m/s	Birds 52-56
							Stab: F	DLSP inaudible
DLSP Site L _A eq(15min) Contribution								<46
20/08/2024	20:00 (Evening)	85	70	67	44	42	WD: N	Traffic 42-85
							WS: 0.2m/s	Birds 42-48
							Stab: n/a	Train 44-68
								DLSP inaudible
DLSP Site L _A eq(15min) Contribution								<35
20/08/2024	22:42 (Night)	80	57	59	43	41	WD: N	Ocean hum 41-55
							WS: 0.1m/s	Traffic 41-80
							Stab: F	Birds 41-46
								DLSP inaudible
DLSP Site L _A eq(15min) Contribution								<35
DLSP Site L _A max(15min) Contribution								<45

Note 1: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Morning Shoulder - the period from 6am to 7am; Night - the remaining periods.

Note 2: Data from on-site weather station or attended operator observations.

4.9 Assessment Results – Location DN-13

The monitored noise level contributions and observed meteorological conditions at Location DN-7 are presented in **Table 12**.

Table 12 DN-13 – Operator Attended Noise Monitoring Results

Date	Time (hrs) ¹	Descriptor (dBA re 20µPa)					Meteorology ²	Description and SPL, dBA
		L _{Amax}	L _{A10}	L _{Aeq}	L _{A90}	L _{Amin}		
21/08/2024	06:15						WD: N	Traffic 49-69
	(Morning	69	61	58	52	49	WS: 0.1m/s	Birds 49-56
	Shoulder)						Stab: E	DLSP inaudible
	DLSP Site L _{Aeq} (15min) Contribution							
	DLSP Site L _{Amax} (15min) Contribution							
21/08/2024	07:33						WD: N	Traffic 48-69
	(Day)	69	60	57	53	50	WS: 0.1m/s	Birds 48-56
							Stab: E	DLSP inaudible
	DLSP Site L _{Aeq} (15min) Contribution							
	DLSP Site L _{Amax} (15min) Contribution							
21/08/2024	07:48						WD: N	Traffic 49-67
	(Day)	67	60	57	53	49	WS: 0.1m/s	Birds 52-56
							Stab: E	DLSP inaudible
	DLSP Site L _{Aeq} (15min) Contribution							
	DLSP Site L _{Amax} (15min) Contribution							
20/08/2024	19:42						WD: N	Traffic 41-63
	(Evening)	63	58	53	43	41	WS: 0.6m/s	Train 42-58
							Stab: n/a	DLSP inaudible
	DLSP Site L _{Aeq} (15min) Contribution							
	DLSP Site L _{Amax} (15min) Contribution							
20/08/2024	22:25						WD: N	Train 38-67
	(Night)	67	52	47	39	37	WS: 0.1m/s	Traffic 38-58
							Stab: F	Aircraft 38-40
								Birds 38-44
								Ocean hum <38
DLSP Site L _{Aeq} (15min) Contribution								DLSP inaudible
DLSP Site L _{Aeq} (15min) Contribution								<35
DLSP Site L _{Amax} (15min) Contribution								<45

Note 1: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Morning Shoulder - the period from 6am to 7am; Night - the remaining periods.

Note 2: Data from on-site weather station or attended operator observations.

5 Discussion

5.1 Discussion of Results - Location DN-6

The noise monitoring survey identified that the acoustic environment at this location is dominated by road traffic noise from the Princes Highway, approximately 350m to the east. DLSP noise was inaudible during all measurement periods with the noise contribution calculated (during short breaks in traffic) to be below the relevant noise criteria for all periods. Extraneous sources audible during the survey included traffic, birds, livestock and insects.

5.2 Discussion of Results - Location DN-7

The noise monitoring survey identified that the acoustic environment at this location is dominated by road traffic noise from the Princes Highway, approximately 350m to the west. DLSP noise was inaudible during all measurement periods and the noise contributions were calculated (during short breaks in traffic) to be below the relevant noise criteria for all periods. Extraneous sources audible during the survey included traffic, trains, birds and aircraft.

5.3 Discussion of Results - Location DN-8

The noise monitoring survey identified that the acoustic environment at this location is dominated by road traffic noise from the Princes Highway, approximately 350m to the east. DLSP noise was inaudible during all measurement periods and the noise contributions were calculated (during short breaks in traffic) to be below the relevant noise criteria for all periods. Extraneous sources audible during the survey included traffic, birds and insects.

5.4 Discussion of Results - Location DN-9

The noise monitoring survey identified that the acoustic environment at this location is dominated by road traffic noise from the Princes Highway, approximately 160m to the east. DLSP noise was inaudible during all measurement periods with the noise contribution calculated (during short breaks in traffic) to be below the relevant noise criteria for all periods. Extraneous sources audible during the survey included traffic, birds, aircraft and insects.

5.5 Discussion of Results - Location DN-10

The noise monitoring survey identified that the acoustic environment at this location is dominated by road traffic noise from the Princes Highway, approximately 140m to the east. DLSP noise was inaudible during all measurement periods with the noise contribution calculated (during short breaks in traffic) to be below the relevant noise criteria for all periods. Extraneous sources audible during the survey included traffic and birds.

5.6 Discussion of Results - Location DN-11

The noise monitoring survey identified that the acoustic environment at this location is dominated by road traffic noise from the Princes Highway, approximately 150m to the east. DLSP noise was inaudible during all measurement periods with the noise contribution calculated (during short breaks in traffic) to be below the relevant noise criteria for all periods. Extraneous sources audible during the survey included traffic and birds.

5.7 Discussion of Results - Location DN-12

The noise monitoring survey identified that the acoustic environment at this location is dominated by road traffic noise from the Princes Highway, approximately 470m to the west. DLSP noise was inaudible during all measurement periods with the noise contribution calculated (during short breaks in traffic) to be below the relevant noise criteria for all periods. Extraneous sources audible during the survey included traffic, birds, ocean hum and passing trains.

5.8 Discussion of Results - Location DN-13

The noise monitoring survey identified that the acoustic environment at this location is dominated by road traffic noise from Riverside Drive, approximately 10m to the west. DLSP noise was inaudible during all measurement periods with the noise contribution calculated (during short breaks in traffic) to be below the relevant noise criteria for all periods. Extraneous sources audible during the survey included traffic, birds, aircraft, ocean hum and passing trains.

6 Conclusion

Muller Acoustic Consulting Pty Ltd (MAC) has completed a Noise Monitoring Assessment (NMA) on behalf of Project Location for Dunmore Lakes Sand Project (DLSP), Dunmore, NSW.

Attended noise monitoring was undertaken between Tuesday 20 August 2024 and Thursday 22 August 2024 at eight representative monitoring locations. The assessment has identified that the calculated noise emissions generated by DLSP were below the relevant criteria at all locations during all measurement periods, therefore satisfying the relevant consent conditions.

This page has been intentionally left blank

Appendix A – Glossary of Terms

A number of technical terms have been used in this report and are explained in **Table A1**.

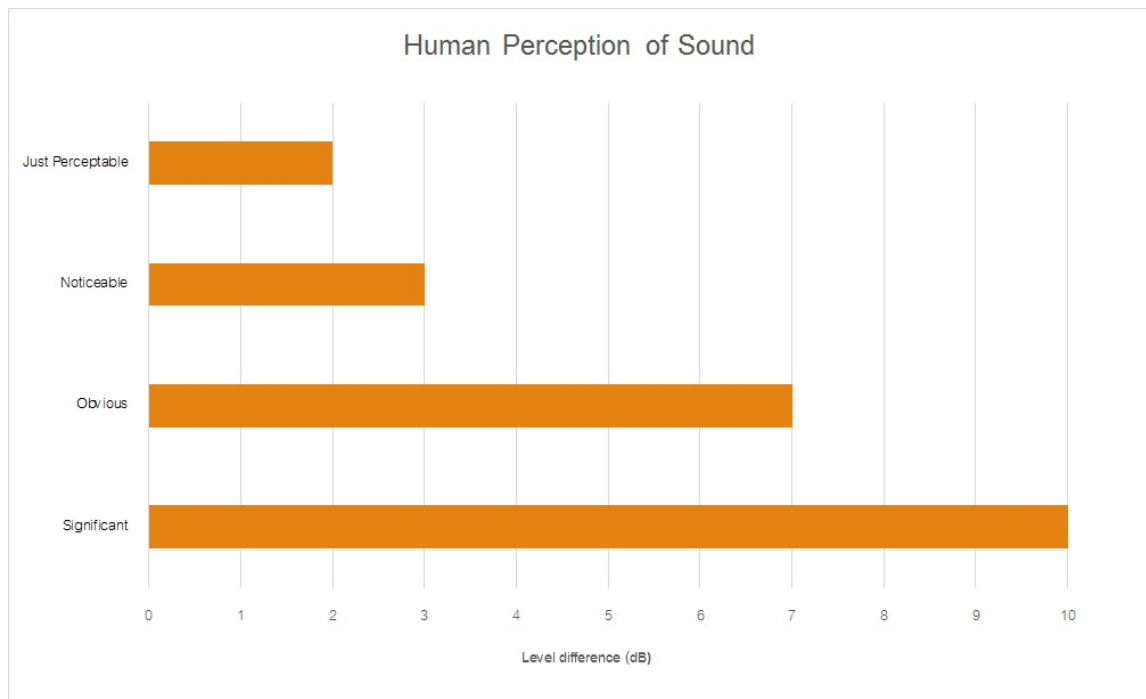
Table A1 Glossary of Acoustical Terms	
Term	Description
1/3 Octave	Single octave bands divided into three parts
Octave	A division of the frequency range into bands, the upper frequency limit of each band being twice the lower frequency limit.
ABL	Assessment Background Level (ABL) is defined in the NPI as a single figure background level for each assessment period (day, evening and night). It is the tenth percentile of the measured L90 statistical noise levels.
Ambient Noise	The total noise associated with a given environment. Typically, a composite of sounds from all sources located both near and far where no particular sound is dominant.
A Weighting	A standard weighting of the audible frequencies designed to reflect the response of the human ear to sound.
Background Noise	The underlying level of noise present in the ambient noise, excluding the noise source under investigation, when extraneous noise is removed. This is usually represented by the LA90 descriptor
dBA	Noise is measured in units called decibels (dB). There are several scales for describing noise, the most common being the 'A-weighted' scale. This attempts to closely approximate the frequency response of the human ear.
dB(Z), dB(L)	Decibels Z-weighted or decibels Linear (unweighted).
Extraneous Noise	Sound resulting from activities that are not typical of the area.
Hertz (Hz)	The measure of frequency of sound wave oscillations per second - 1 oscillation per second equals 1 hertz.
LA10	A sound level which is exceeded 10% of the time.
LA90	Commonly referred to as the background noise, this is the level exceeded 90% of the time.
LAeq	Represents the average noise energy or equivalent sound pressure level over a given period.
LAmx	The maximum sound pressure level received at the microphone during a measuring interval.
Masking	The phenomenon of one sound interfering with the perception of another sound. For example, the interference of traffic noise with use of a public telephone on a busy street.
RBL	The Rating Background Level (RBL) as defined in the NPI, is an overall single figure representing the background level for each assessment period over the whole monitoring period. The RBL, as defined is the median of ABL values over the whole monitoring period.
Sound power level (Lw or SWL)	This is a measure of the total power radiated by a source in the form of sound and is given by $10 \cdot \log_{10} (W/W_0)$. Where W is the sound power in watts to the reference level of 10^{-12} watts.
Sound pressure level (Lp or SPL)	the level of sound pressure; as measured at a distance by a standard sound level meter. This differs from Lw in that it is the sound level at a receiver position as opposed to the sound 'intensity' of the source.

Table A2 provides a list of common noise sources and their typical sound level.

Table A2 Common Noise Sources and Their Typical Sound Pressure Levels (SPL), dBA

Source	Typical Sound Pressure Level
Threshold of pain	140
Jet engine	130
Hydraulic hammer	120
Chainsaw	110
Industrial workshop	100
Lawn-mower (operator position)	90
Heavy traffic (footpath)	80
Elevated speech	70
Typical conversation	60
Ambient suburban environment	40
Ambient rural environment	30
Bedroom (night with windows closed)	20
Threshold of hearing	0

Figure A1 – Human Perception of Sound



Muller Acoustic Consulting Pty Ltd

PO Box 678, Kotara NSW 2289

ABN: 36 602 225 132

Ph: +61 2 4920 1833

www.mulleracoustic.com



10. Appendix D Rehabilitation Progress Monitoring



FY17 Re-aligned Western Tributary Rehabilitation Progress



FY18 Re-aligned Western Tributary Rehabilitation Progress



FY19 Re-aligned Western Tributary Rehabilitation Progress



FY20 Re-aligned Western Tributary Rehabilitation Progress



FY21 Re-aligned Western Tributary Rehabilitation Progress



FY17 NW Stage 2 Swamp Oak Forest Rehabilitation Progress



FY18 NW Stage 2 Swamp Oak Forest Rehabilitation Progress



FY19 NW Stage 2 Swamp Oak Forest Rehabilitation Progress



FY20 NW Stage 2 Swamp Oak Forest Rehabilitation Progress



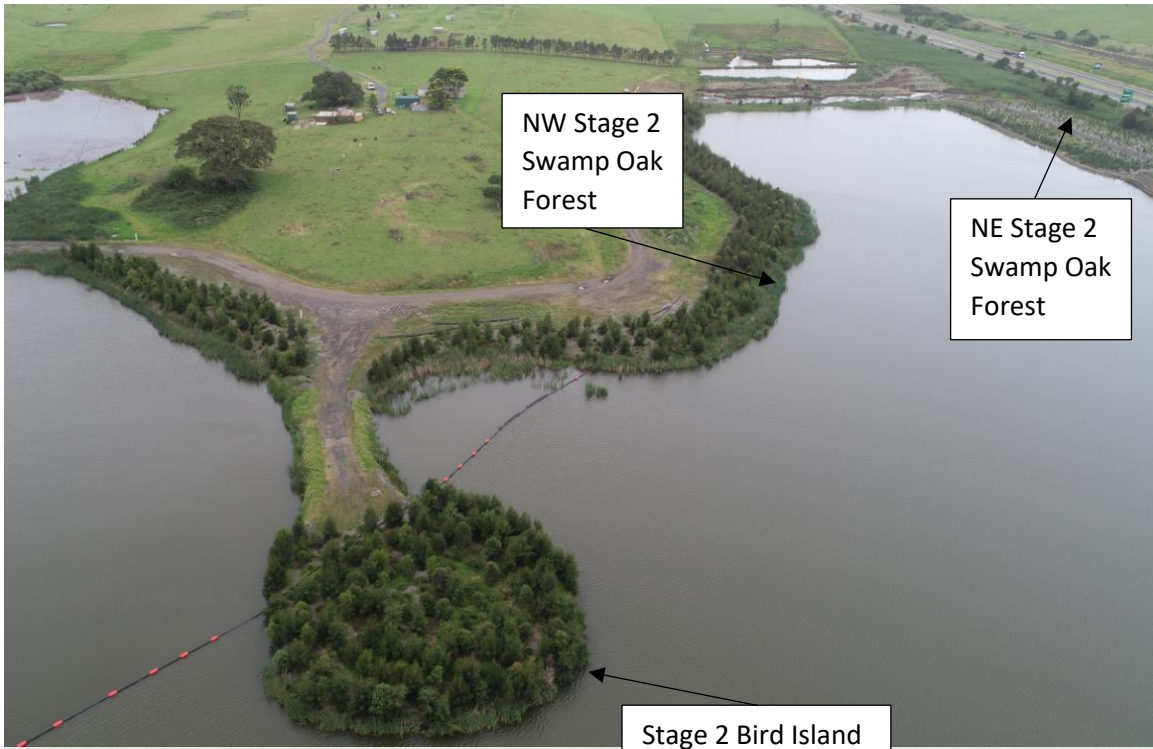
FY21 NW Stage 2 Swamp Oak Forest Rehabilitation Progress



FY20 NE Stage 2 Swamp Oak Forest Rehabilitation Progress



FY21 NE Stage 2 Swamp Oak Forest Rehabilitation Progress



Dunmore Bird Island and Stage 2 Rehabilitation Area December 2020



FY25 NE Stage 2 Swamp Oak Forest Rehabilitation Progress



11. Appendix E Ground Water Monitoring Report

TRACE

ENVIRONMENTAL

Dunmore Sand & Soil Annual Groundwater Monitoring Report

38 Tabbita Road, Dunmore, NSW

26 September 2025



Dunmore Sand & Soil Annual Groundwater Monitoring Report

38 Tabbita Road, Dunmore, NSW

Prepared for:

Boral Resources NSW Pty Ltd

Revision	Date	Author	Approver	Issued
Draft	22 September 2025	JE	KH	22 September 2025
Rev0	26 September 2025	JE	KH	26 September 2025

Author	Reviewed
 Jack Ellis Senior Environmental Scientist B.Sc. M.Geol. (Geological Sciences)	 Ken Henderson Principal Environmental Scientist B.Sc. (Hons Geology) EIANZ CEnvP (SC) #SC40922  

Ref. No.:	40.04
Disclaimer:	THIS DOCUMENT IS SUBJECT TO LIMITATIONS NOTED

Table of Contents

Executive Summary	iii
1 Introduction	1
1.1 Objectives	1
1.2 Scope of Works	1
2 Monitoring Well Network and Methodology	3
2.1 Data Collection	3
2.1.1 Groundwater Levels	3
2.1.2 Groundwater Quality Measurements and Data	3
2.1.3 Rainfall Data	3
2.1.4 Tidal Data	4
2.1.5 Laboratory Analytical Data	4
2.2 Quality Assurance/Quality Control	4
3 Groundwater Results and Discussion	5
3.1 Groundwater Levels and Rainfall Data	5
3.1.1 Stages 2-4	5
3.1.2 Stage 5	5
3.1.3 Discussion – Groundwater Levels & Rainfall	5
3.2 Groundwater Levels and Tidal Data	6
3.3 Groundwater Flow Direction and Hydraulic Gradient	6
3.4 Groundwater Quality and Laboratory Analytical Results and Discussion	7
3.4.1 Stages 2-4	7
3.4.2 Stage 5	8
3.4.3 Schoeller Plots	8
4 Conclusions and Recommendations	9
4.1 Summary and Conclusions	9
4.2 Recommendations	9
5 References	10
6 Limitations	11

Figures

Title	Figure
Site Locality Plan	1
Site Staging Layout	2
Groundwater Monitoring Well Locations – Stages 2-4	3
Groundwater Monitoring Well Locations – Stage 5	4

Appendices

Title	Appendix
Groundwater Level Data – Including Rainfall and Tidal Comparisons and Flow Directions	A
Groundwater Analytical Data – Including Schoeller Plots	B
Laboratory Analytical Reports	C

Executive Summary

TRACE Environmental was engaged by Boral Resources NSW Pty Ltd (Boral) to prepare an Annual Groundwater Monitoring Report for the 2024-2025 year at the Dunmore Sand & Soil (DSS)¹ quarry located at 38 Tabbita Road, Dunmore, NSW ('the site'). This Annual Groundwater Monitoring Report, consisting of a summary and interpretation of groundwater levels and quality data, is required to be completed for inclusion with the site's Annual Environmental Monitoring Report (AEMR) that summarises the ongoing groundwater monitoring and management requirements during ongoing excavation and processing of sand at the site.

The scope of works undertaken for this report included:

- Conducting a review of water level data from data loggers installed in groundwater monitoring wells at Stages 2-4 and Stage 5 at the site. This includes collating, processing and calculating water levels from data downloaded from water loggers, and calibration with manual water levels recorded during ongoing groundwater gauging conducted by Boral during the June 2024 to June 2025 monitoring period;
- Conducting a comparison of water level data with available rainfall and tidal data for the June 2024 to June 2025 monitoring period;
- Conducting a review of groundwater quality data collected by International Environmental Consultants (IEC) up to May 2025 and by Boral from June 2025 from monitoring wells located at Stages 204 and Stage 5 at the site during August 2024, November 2024, February 2025 and May 2025;
- Conducting an assessment of water levels and groundwater quality data against the trigger levels outlined in the relevant development consents and management plans, as outlined above; and
- Preparation of this *Annual Groundwater Monitoring Report*.

Based on the findings of this report, the following conclusions and recommendations are provided:

- Fluctuations were observed in groundwater levels, which are likely related to rainfall recharge, with some minor tidal influence also observed; and
- Decreases in groundwater levels were noted at some locations, which typically correlate with periods of low rainfall, resulting in low recharge as the aquifer drains to Rocklow Creek and Minnamurra River to the south-east. However, overall decreases in groundwater level were observed in monitoring wells MW5B2s and MW5B2d, which may be a result of the proximity of these wells to dredging activities in this portion of the site.

Based on the above, it is concluded that fluctuations in water table levels are naturally occurring and are not caused by dredging activities at the site, except at the immediate vicinity of dredging activities at the Stage 5 portion of the site.

Based on the results of the annual monitoring for the 2024 to 2025 period, it is recommended that quarterly groundwater monitoring events (GMEs) and monthly groundwater gauging continue to be conducted for Stages 2-4 and Stage 5 at the site, in accordance with the applicable site management plans.

¹ Dunmore Sand & Soil Pty Ltd is owned and operated by Boral.

1 Introduction

TRACE Environmental was engaged by Boral Resources NSW Pty Ltd (Boral) to prepare an Annual Groundwater Monitoring Report for the 2024-2025 year at the Dunmore Sand & Soil (DSS)² quarry located at 38 Tabbita Road, Dunmore, NSW, identified as Part Lots 3 and 5 DP1030504 Part Lot 6 DP11159 and Pat Lot 6 DP1001931 ('the site'). A Locality Plan showing the location of the site is presented in **Figure 1** and a Site Plan showing the layout of the site is presented in **Figure 2**.

The site is approved for the extraction and processing of approximately eight million tonnes of sand under Development Consent 195-8-2004³, and is separated into two areas identified as 'Stages 2-4' and 'Stage 5'⁴ (refer to **Figure 2**). Due to the excavation activities conducted at the site, it is understood that there is the potential for site works to influence groundwater beneath the site. As such, DSS has implemented a groundwater monitoring and management program in line with the Development Consent for the site, as per the following plans:

- Groundwater Monitoring and Management Plan (GMMP), prepared by Environmental Earth Sciences (EES) in 2018 (EES 2018); and
- Stage 5 Soil and Water Management Plan (SWMP), prepared by EMM Consulting (EMM) in 2025 (EMM 2025).

This Annual Groundwater Monitoring Report, consisting of a summary and interpretation of groundwater levels and quality data, is required to be completed for inclusion with the site's Annual Environmental Monitoring Report (AEMR) that summarises the ongoing groundwater monitoring and management requirements during ongoing excavation and processing of sand at the site.

1.1 Objectives

The objective of this Annual Groundwater Monitoring Report is to assess whether ongoing extraction and processing of sand is influencing groundwater levels and quality at the site, in accordance with the Development Consent and management plans issued to the site. This report has been prepared with reference to the 2023-2024 Annual Groundwater Monitoring Report prepared by EES in May 2025⁵

1.2 Scope of Works

The following scope of works was undertaken in order to meet the objectives described above:

- Conducted a review of water level data from data loggers installed in groundwater monitoring wells DG1s, DG5d, DG6s, DG17, DG21, DG31, DG36 (Stages 2-4), MW5A1, MW5A3, MW5B2D and MW5B2s (Stage 5) and GW4 (off-site to the north-west). Refer to **Figures 3** and **4** for the locations of groundwater monitoring wells. This includes collating, processing and calculating water levels from data downloaded from water loggers, and calibration with manual water levels recorded during ongoing groundwater gauging conducted at the site by Boral during the June 2024 to June 2025 monitoring period;

² Dunmore Sand & Soil Pty Ltd is owned and operated by Boral.

³ Development Consent 195-8-2004, Modified June 2016, March 2020, November 2020.

⁴ It is noted that the Stage 1 area of the site was completed and the DA surrendered in 2013.

⁵ Environmental Earth Sciences (EES) 2025, 2023 – 2024 Annual Report of Groundwater Monitoring at 38 Tabbita Road, Dunmore, NSW, Dunmore Sand & Soil Pty Ltd, 5 May 2025.

- Compared the groundwater water level data with available rainfall and tidal data for the June 2024 to June 2025 monitoring period;
- Reviewed groundwater quality data collected by International Environmental Consultants (IEC) up to May 2025 and by Boral from June 2025. Groundwater samples were collected from groundwater monitoring wells DG1s, DG5d, DG6s, DG17, DG21, DG31, DG36 (Stages 2-4), MW5A1, MW5A3, MW5B2D, MW5B2, MW5B3 and MW5B4 (Stage 5) and GW4 (off-site to the north-west) during August 2024, November 2024, February 2025 and May 2025;
- Conducted an assessment of water levels and groundwater quality data against the trigger levels outlined in the relevant development consents and management plans, as outlined above; and
- Preparation of this *Annual Groundwater Monitoring Report*.

2 Monitoring Well Network and Methodology

2.1 Data Collection

2.1.1 Groundwater Levels

Groundwater level data was collected by DSS personnel using pressure transducer data loggers and provided to TRACE Environmental for processing and interpretation. Data from the following groundwater monitoring wells was provided:

- Stages 2-4: DG1s, DG5d, DG6s, DG17, DG21, DG31 and DG36; and
- Stage 5: MW5A1, MW5A3, MW5B2s and MW5B2d.

It is noted that additional data from an additional groundwater monitoring well identified as GW4 was also provided, however the data was found to be corrupted and could not be used. Additional groundwater monitoring wells are also present at the site that were not monitored for groundwater levels. A summary of the groundwater monitoring well network (including easting/northing coordinates and well status) is provided on a summary table provided in **Appendix A**, and the locations of groundwater monitoring wells present at the site are shown on **Figures 3 and 4**.

Manual groundwater levels were also measured at monthly intervals from active groundwater monitoring wells. Measurements were made from the top of casing (TOC) of each groundwater monitoring well, with the TOCs having previously been surveyed to the Australian Height Datum (AHD).

Data logger and manually recorded groundwater level data collected from the above listed groundwater monitoring wells located at Stages 2-4 and Stage 5 for the period of June 2024 to June 2025 is provided on gauging tables provided in **Appendix A**.

2.1.2 Groundwater Quality Measurements and Data

Water quality monitoring of the active groundwater monitoring well network was completed by IEC personnel (June 2024 to May 2025) and Boral personnel (June 2025), on behalf of DSS, at monthly intervals. Field parameters including standing water level, temperature, pH, electrical conductivity (EC) and oxidation-reduction potential (ORP) was recorded and provided to TRACE Environmental for comparison against the site trigger levels outlined in the GMMP (EES 2018) and SWMP (EMM 2025). The groundwater quality data summary table is provided in **Appendix A**.

2.1.3 Rainfall Data

Rainfall data was obtained from the Bureau of Meteorology⁶ (BOM) for the nearest weather station to the site – Kiama (Bombo Headland), Site #068242, located approximately 4.6km south of the site.

A total of 1,149.8mm of rainfall was recorded over the June 2024 to June 2025 monitoring period, which is less than the previous June 2023 – June 2024 where a total of 1,633.2mm of rainfall was recorded. It is noted that during the June 2024 to June 2025 monitoring period, there were four significant rainfall events exceeding 60mm per day: 7 June 2024 (131.2mm), 16 January 2025 (60.6mm), 30 March 2025 (61.4mm) and 23 May 2025 (72.6mm).

⁶ <http://www.bom.gov.au/climate/data/>

Comparison of rainfall data with water level data recorded from groundwater monitoring wells at the Stages 2-4 and Stage 5 areas of the site for the June 2024 to June 2025 monitoring period is shown on graphs provided in **Appendix A (Figures A1 to A11)**.

2.1.4 Tidal Data

Tidal data was obtained from the Minnamurra River Tidal Monitoring Station (#214442) for the period of 1 July 2024 to 1 July 2025⁷.

Comparison of tidal data with water level data recorded from groundwater monitoring wells at the Stages 2-4 and Stage 5 areas of the site for the June 2024 to June 2025 monitoring period is shown on graphs provided in **Appendix A (Figures A12 to A22)**.

2.1.5 Laboratory Analytical Data

Quarterly Groundwater Monitoring Events (GMEs) were conducted at the site by IEC field staff during August 2024, November 2024, February 2025 and May 2025. Groundwater samples were collected from active groundwater monitoring wells DG1s, DG5s, DG5d, DG6s, DG6d, DG7, DG17, DG21, DG31s, DG35, DG36, GW4, MW5A1, MW5A3, MW5B2s, MW5B2d, MW5B3 and MW5B4 and submitted to ALS Environmental, a National Association of Testing Authorities Australia (NATA) accredited laboratory for analysis of alkalinity (as CaCO₃), sulfate (SO₄), chloride, major cations (calcium, magnesium, sodium and potassium), dissolved iron, ammonia, nitrate, nitrite, total kjeldahl nitrogen (TKN), total nitrogen, total phosphorous, faecal coliforms and E.coli, and enterococci.

The results of the groundwater analysis are presented in Tables and Schoeller Plots in **Appendix B** and laboratory analytical reports are provided in **Appendix C**. Results were compared to the site-specific trigger values as outlined in the GMMP (EES 2018) for Stages 2-4 and the SWMP (EMM 2025) for Stage 5, as it is noted that the criteria outlined in the Development Consent are generic and not site-specific.

It is noted that groundwater monitoring wells located west of Princes Highway (i.e., DG1s, DG17, DG21, DG31s, DG35 and DG36) are presented separately to groundwater monitoring wells located east of Princes Highway (i.e., DG5s, DG5d, DG6s, DG6d and DG7) due to historical evidence of tidal influence on the easterly groundwater wells (EES 2025).

2.2 Quality Assurance/Quality Control

Assessment of the laboratory QA/QC procedures and results indicates that quality assurance was achieved and therefore that the analytical data is considered representative of site conditions at the time of the investigation. The internal laboratory QA/QC procedures were generally met with some minor deviations.

No details of field QA/QC procedures were provided, including collection of field duplicates, sampling methodology and field observations. As such, the quality, precision and consistency of sampling methods cannot be assessed, and the laboratory analytical results cannot be compared to field observations.

⁷ Tidal data from the Minnamurra River Tidal Monitoring Station (#214442) was purchased from Manly Hydraulics Laboratory on 7 August 2025 - <https://www.mhl.nsw.gov.au/Station-214442>

3 Groundwater Results and Discussion

3.1 Groundwater Levels and Rainfall Data

3.1.1 Stages 2-4

Groundwater level data collected from the Stages 2-4 groundwater monitoring wells (i.e., DG1s, DG5d, DG6s, DG17, DG21, DG31 and DG36) for the period of June 2024 to June 2025 was compared to rainfall totals for the same period. Graphs presenting the comparisons of groundwater level data with rainfall totals are provided in **Appendix A, Figures A1 to A7**, and is discussed below:

- Groundwater levels in all monitoring wells display a strong correlation with large individual rainfall events (i.e., >20mm) and periods of prolonged rainfall with a slight lag time, consistent with previous assessments (as outlined in EES 2025);
- Remaining fluctuations in groundwater are attributed to smaller rainfall events (i.e., <20mm) and/or tidal influences; and
- Background groundwater monitoring well DG5d reported water levels ranging from 0.1561 to 2.0947mBTOC.

3.1.2 Stage 5

Groundwater level data collected from the Stage 5 groundwater monitoring wells (i.e., MW5A1, MW5A3, MW5B2s and MW5B2d) for the period of June 2024 to June 2025 was compared to rainfall totals for the same period. Graphs presenting the comparisons of groundwater level data with rainfall totals are provided in **Appendix A, Figures A8 to A11**, and is discussed below:

- Groundwater levels in all monitoring wells display a strong correlation with large individual rainfall events (i.e., >20mm) and periods of prolonged rainfall with a very short lag time, consistent with previous assessments (as outlined in EES 2025). The very short lag time between rainfall and groundwater level increases is likely a result of direct infiltration occurring at this portion of the site, and potential localised run-off from exposed bedrock;
- Remaining fluctuations in groundwater are attributed to smaller rainfall events (i.e., <20mm) and/or tidal influences;
- Groundwater monitoring wells MW5B2s and MW5B2d displayed overall decreasing groundwater levels over the monitoring period, potentially a result of the proximity of these wells to dredging activities in this portion of the site; and
- Background groundwater monitoring well DG5d reported water levels ranging from 0.1561 to 2.0947mBTOC.

3.1.3 Discussion – Groundwater Levels & Rainfall

Based on the review of groundwater levels and rainfall data over the June 2024 to June 2025 monitoring period, it appears that the aquifer at the site responds rapidly to local rainfall events, with increases in groundwater level observed within a short period of significant rainfall events. This is consistent with historical site observations, with rapid aquifer responses to rainfall identified since 2009.

Low rainfall between June 2024 and November 2024 generally resulted in low aquifer recharge and decreasing groundwater levels, with sharp increases observed during rainfall events. Groundwater levels and aquifer

recharge remained generally stable between November 2024 and April 2025, with sharp increases in groundwater levels again observed during rainfall events followed by decreases during subsequent dry periods. From April 2025 to June 2025, increased rainfall and saturated conditions resulted in increased aquifer recharge and groundwater levels, with levels similar to those observed at the start of the monitoring period. Four significant rainfall events (i.e., >60mm) were recorded during the June 2024 to June 2025 monitoring period (7 June 2024 [131.2mm], 16 January 2025 [60.6mm], 30 March 2025 [61.4mm] and 23 May 2025 [72.6mm]), with sharp increases in groundwater levels observed very quickly following these rainfall events.

Rainfall and groundwater level data is provided in **Appendix A** and presented on graphs **A1** to **A11**.

3.2 Groundwater Levels and Tidal Data

All groundwater monitoring well locations are susceptible to tidal influence, although this is typically low and groundwater levels appear to be more strongly influenced by rainfall. Groundwater monitoring wells DG5d and DG6s have historically displayed a larger response to tidal influences (EES 2025), which has also been observed during the current monitoring period. EES (2025) also noted that downgradient groundwater monitoring wells MW5A1 and MW5A3, located close to Rocklow Creek, have historically shown to be strongly influenced by tidal changes, however this was not observed during the previous 2023-2024 (EES 2025) or current monitoring period. Instead, these groundwater monitoring wells were consistent with upgradient wells MWB2s and MWB2d which showed low tidal influence, consistent with historical data.

Groundwater monitoring well DG17 has historically been strongly influenced by tidal changes in Rocklow and Dunmore Creeks (EESI 2025). However, this groundwater monitoring well has not been shown to be influenced by tidal changes during the previous 2023-2024 (EES 2025) or current monitoring periods, which is likely reflective of a reduced tidal influence on groundwater levels in this portion of the site.

Tidal and groundwater level data is provided in **Appendix A** and presented on graphs **A12** to **A22**.

3.3 Groundwater Flow Direction and Hydraulic Gradient

Groundwater flow direction was calculated from manual groundwater level measurements collected monthly during over the course of the current monitoring period. Based on these measurements, the following observations are provided:

- Groundwater at Stages 2-4 was inferred to flow generally in a south-easterly/easterly direction, towards Rocklow Creek, Minnamurra River and the South Pacific Ocean, with some mounding observed in the northern portion of the site during some monitoring periods, consistent with historical assessments (EES 2025). Groundwater flow direction at Stages 2-4 is likely influenced by tidal fluctuations and localised dredging activities (such as monitoring well DG36), noting that these localised impacts typically do not alter the overall south-easterly/easterly flow direction;
- Groundwater at Stage 5 was inferred to flow generally in a north-westerly to north-easterly direction, towards Minnamurra River and the South Pacific Ocean, consistent with historical assessments (EES 2025), noting the easterly and southerly groundwater flows were observed in the southern portion of the site during some monitoring periods. Groundwater flow direction at Stage 5 is likely influenced by topography and tidal fluctuations, with an outcrop of latite north of Stage 5B determined by EES (2025) to likely be acting as a no-flow boundary; and
- Based on topography and the location of nearby surface waters, regional groundwater is expected to flow in a general easterly direction, towards the South Pacific Ocean.

Groundwater flow directions are provided in **Figures 6** to **15**

3.4 Groundwater Quality and Laboratory Analytical Results and Discussion

3.4.1 Stages 2-4

Groundwater analytical data from the four GMEs conducted at the site during August 2024, November 2024, February 2025 and May 2025 is presented in **Appendix B, Tables B1** (groundwater monitoring wells west of Princes Highway DG1s, DG17, DG21, DG31s, DG35, DG36 and GW4 [located off-site to the north-west]) and **B2** (eastern groundwater monitoring wells DG5s, DG5d, DG6s, DG6d and DG7) with the results from the eastern and western wells separated due to historical tidal influence on the eastern wells (EES 2025). As outlined in **Section 2.1.5** above, laboratory analytical results have been compared to site specific trigger values provided in the GMMP (EES 2018b) as the criteria outlined in the DA are considered to be generic.

Due to the historical tidal influence on the groundwater wells located east of Princes Highway, salinity (as EC) is typically higher in the eastern wells than the western wells (EES 2025). This is evident in the current monitoring period, except for groundwater wells DG5s and DG7, which generally had lower salinity levels than other eastern wells (also consistent with historical observations [EES 2025]). It is also noted that salinity levels in deeper groundwater monitoring wells in the eastern portion of Stages 2-4 (i.e., DG5d and DG6d) have historically been higher than shallow wells (i.e., DG5s and DG7) (EES 2025), which is evident in the current monitoring period.

A summary of the Stages 2-4 laboratory analytical data in relation to GMMP trigger value exceedances is presented in **Appendix B, Tables B1** and **B2**. The following exceedances of the GMMP (EES 2018) were reported:

Table 3-1: Summary of Stages 2-4 Criteria Exceedances

	August 2024	November 2024	February 2025	May 2025
<u>Western Wells</u>				
DG1s	-	-	-	-
DG17	Bicarbonate Alkalinity	Bicarbonate Alkalinity, Ammonia as N	Bicarbonate Alkalinity	Bicarbonate Alkalinity
DG21	-	-	-	-
DG31s	-	Sulfate as SO ₄	-	-
DG35	Iron, Ammonia as N	-	Iron	Iron
DG36	-	Iron	Bicarbonate Alkalinity	Bicarbonate Alkalinity
GW4	-	-	-	-
<u>Eastern Wells</u>				
DG5s	-	Sulfate as SO ₄ , Chloride, Magnesium, Ammonia as N	-	-
DG5d	Sulfate as SO ₄ , Ammonia as N	-	pH, Sulfate as SO ₄ , Ammonia as N	Sulfate as SO ₄ , Ammonia as N
DG6s	Sulfate as SO ₄ , Magnesium, Iron	pH, Sulfate as SO ₄ , Magnesium, Iron	Sulfate as SO ₄ , Iron	Sulfate as SO ₄ , Iron

DG6d	Bicarbonate Alkalinity, Sulfate as SO ₄ , Chloride, Magnesium, Sodium, Potassium, Iron	pH, Sulfate as SO ₄ , Chloride, Magnesium, Sodium, Potassium, Iron	Bicarbonate Alkalinity, Sulfate as SO ₄ , Chloride, Magnesium, Potassium, Iron	Sulfate as SO ₄ , Chloride, Magnesium, Potassium, Iron
DG7	Ammonia as N	-	-	-

3.4.2 Stage 5

Groundwater analytical data from the four GMEs conducted at the site during August 2024, November 2024, February 2025 and May 2025 is presented in **Appendix B, Table B3** (Stage 5 groundwater monitoring wells MW5A1, MW5A3, MW5B2s, MW5B2d, MW5B3 and MW5B4). As outlined in **Section 2.1.5** above, laboratory analytical results have been compared to site specific trigger values provided in the SWMP (EMM 2025) as the criteria outlined in the DA are considered to be generic, with the more conservative trigger values from the GMMP (EES 2018) also included for reference. A summary of the Stage 5 laboratory analytical data in relation to GMMP trigger value exceedances is presented in **Appendix B, Table B3**.

Total Nitrogen as N was reported to exceed the SWMP (EMM 2025) trigger values in every groundwater monitoring well during the August 2024, November 2024, February 2024 and May 2025 GMEs, as well as Total Phosphorus as P in groundwater monitoring well MW5B4 during the November 2024 GME. All other water quality parameters were within the values outlined in the SWMP during each GME.

3.4.3 Schoeller Plots

Groundwater analytical data from the four GMEs conducted at the site during August 2024, November 2024, February 2025 and May 2025 has been presented in a series of Schoeller Plots provided in **Appendix B**, graphs **B1** to **B22**. The following summary is provided:

- Elevated sodium and chloride concentrations in monitoring wells DG5d, DG6s, DG6d and DG7 indicate a saline influence, consistent with the historical tidal influence observed in these wells located in the eastern portion of Stages 2-4;
- The ion profiles are relatively stable across the four GMEs, indicating a well-buffered chemically equilibrant groundwater system, supported also by the relatively high concentrations of bicarbonate (as CaCO₃) observed in the majority of groundwater samples; and
- No significant seasonal trend is evident across the four GMEs.

4 Conclusions and Recommendations

4.1 Summary and Conclusions

Based on the findings of this report, and subject to the limitations in **Section 6**, the following summary and conclusions are provided:

- Fluctuations in groundwater levels are likely related to rainfall recharge, with some minor tidal influence also observed; and
- Decreases in groundwater levels typically correlate with periods of low rainfall, resulting in low recharge as the aquifer drains to Rocklow Creek and Minnamurra River to the south-east. However, overall decreases in groundwater level were observed in monitoring wells MW5B2s and MW5B2d, which may be a result of the proximity of these wells to dredging activities in this portion of the site.

Based on the above, it is concluded that fluctuations in water table levels are naturally occurring and are not caused by dredging activities at the site, except at the immediate vicinity of dredging activities at the Stage 5 portion of the site.

4.2 Recommendations

Based on the results of the annual monitoring for the 2024 to 2025 period, it is recommended that quarterly GMEs and monthly groundwater gauging continue to be conducted for Stages 2-4 and Stage 5 at the site, in accordance with the applicable site management plans (EES 2018 and EMM 2025).

5 References

- Development Consent 195-8-2004, Modified June 2016, March 2020, November 2020.
- Environmental Earth Sciences 2018, Groundwater Monitoring and Management Plan for 38 Tabbita Road, Dunmore, NSW, 2018.
- Environmental Earth Sciences 2025, 2023 – 2024 Annual Report of Groundwater Monitoring at 38 Tabbita Road, Dunmore, NSW, Dunmore Sand & Soil Pty Ltd, 5 May 2025.

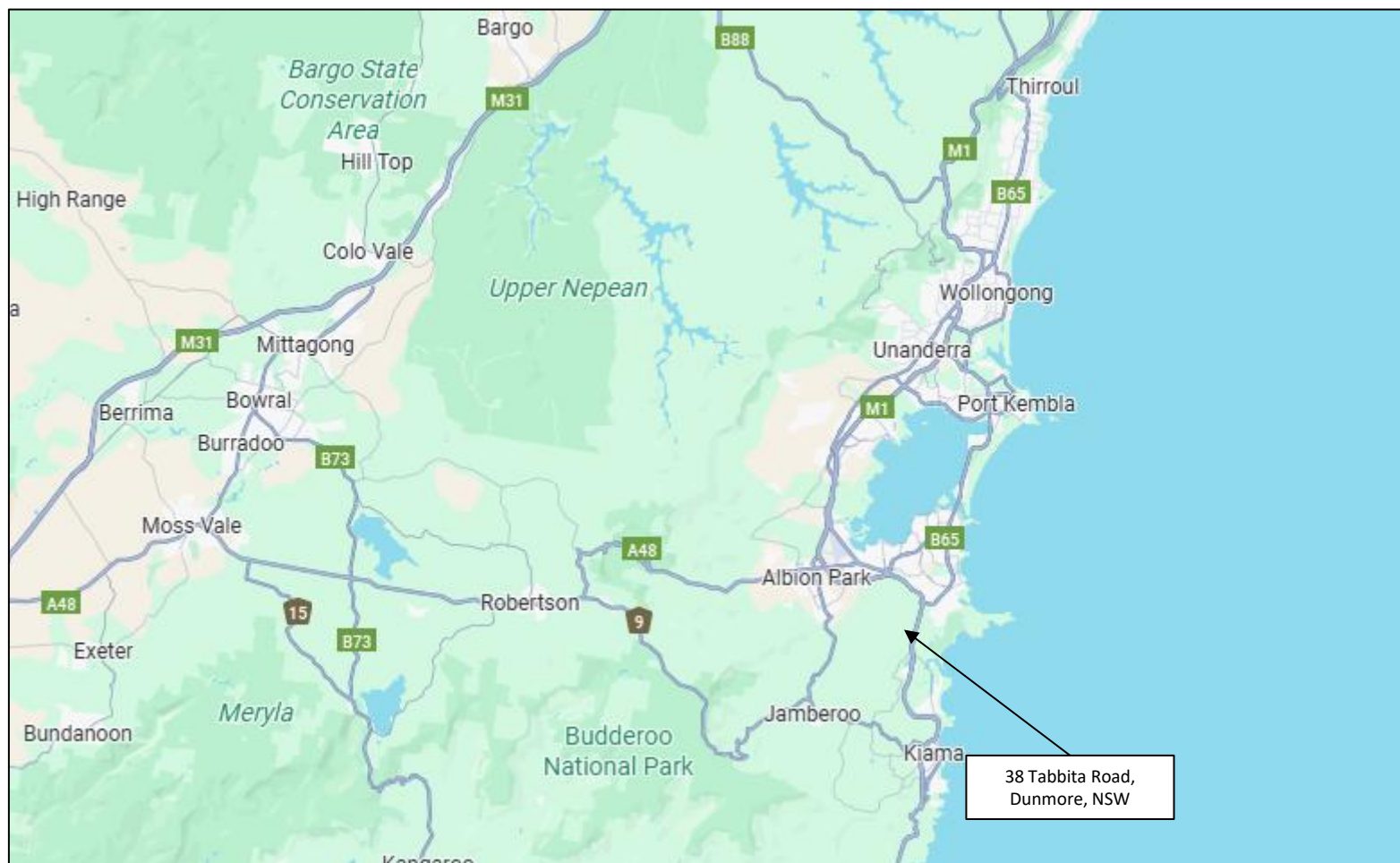
6 Limitations

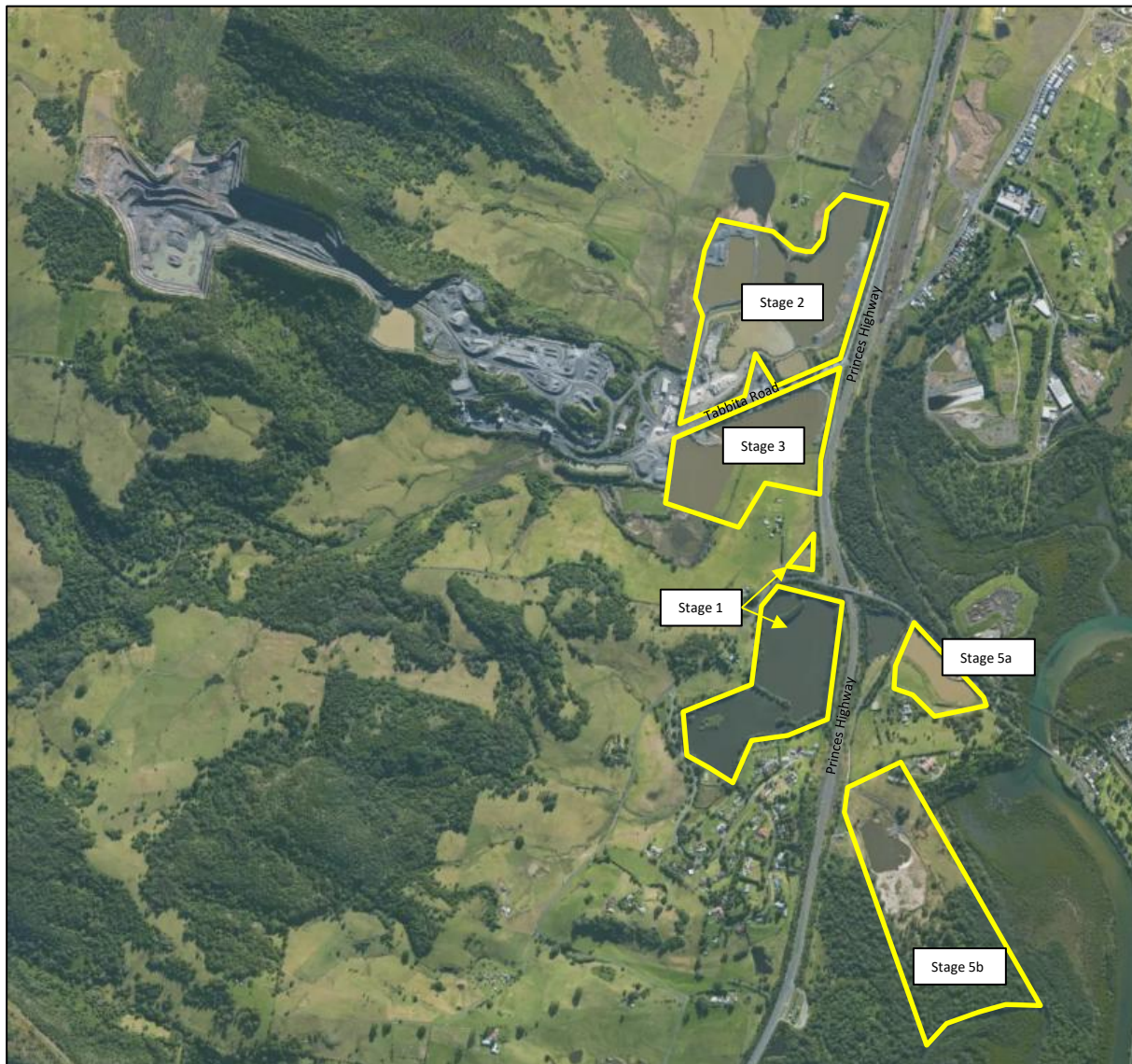
This report has been prepared for Boral Resources NSW Pty Ltd and for the specific purpose to which it refers. No responsibility is accepted to any third party and neither the whole of the report or any part or reference thereto may be published in any document, statement or circular nor in any communication with third parties without our prior written approval of the form and context in which it will appear.

TRACE Environmental has used a degree of skill and care ordinarily exercised by reputable members of our profession practicing in the same or similar locality. The conclusions presented in this report are relevant to the conditions of the site and the state of legislation currently enacted as at the date of this report. We do not make any representation or warranty that the conclusions in this report were applicable in the future as there may be changes in the condition of the site, applicable legislation or other factors that would affect the conclusions contained in this report.

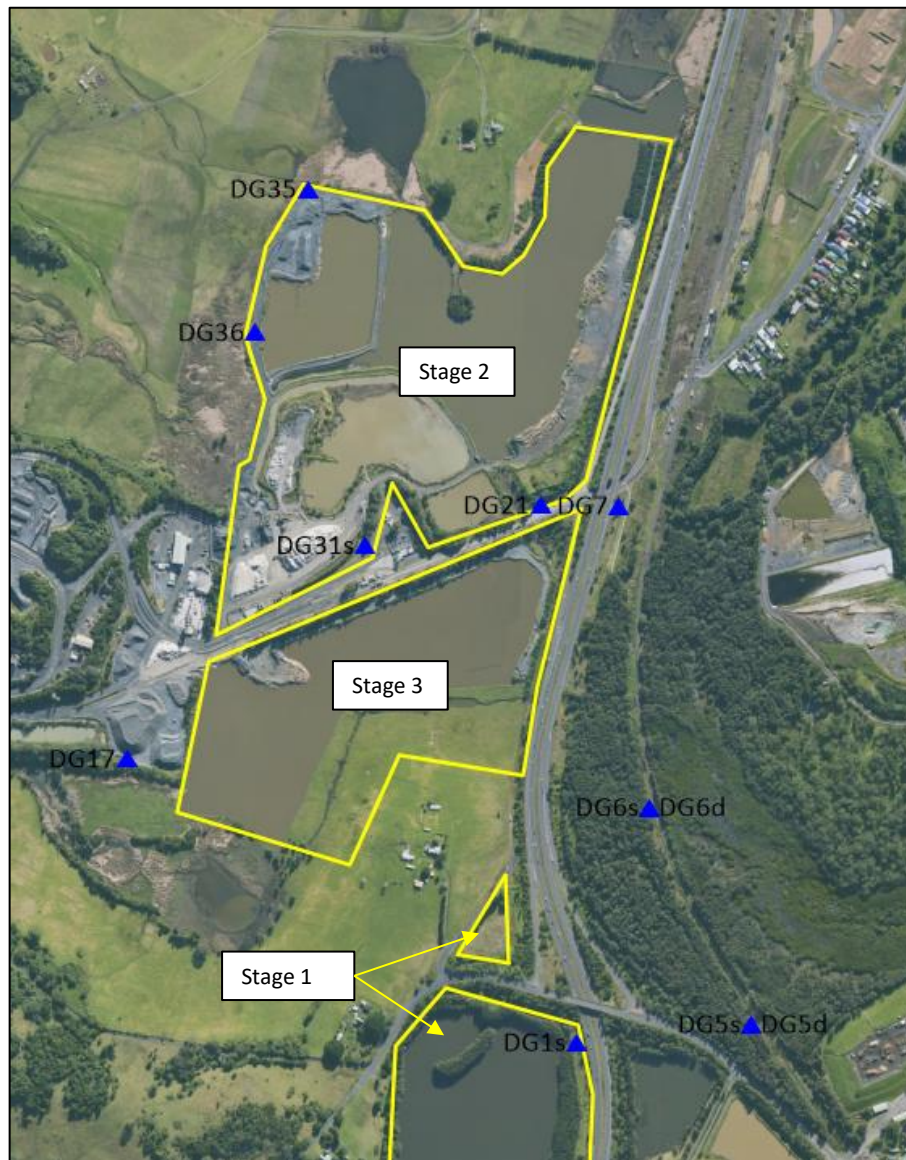
This report and the information contained in it is the intellectual property of TRACE Environmental. Boral Resources NSW Pty Ltd is granted an exclusive licence for the use of the report for the purpose described in the report.

Figures

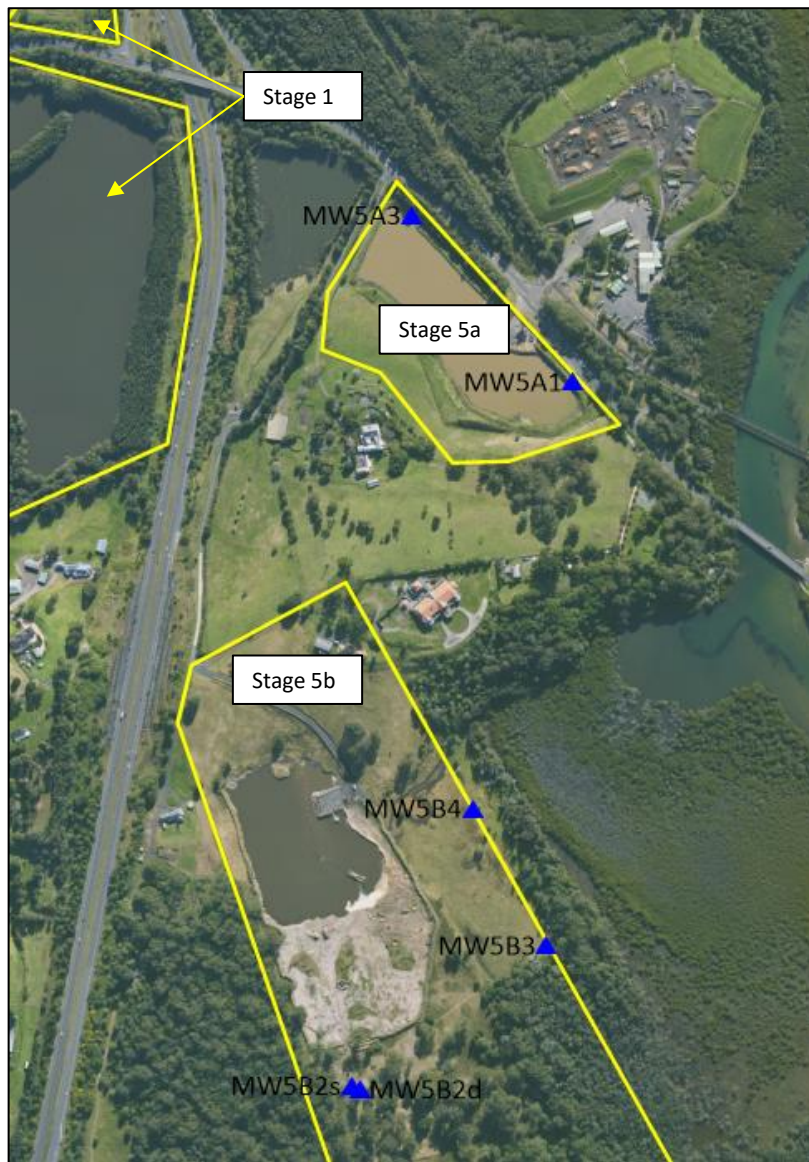




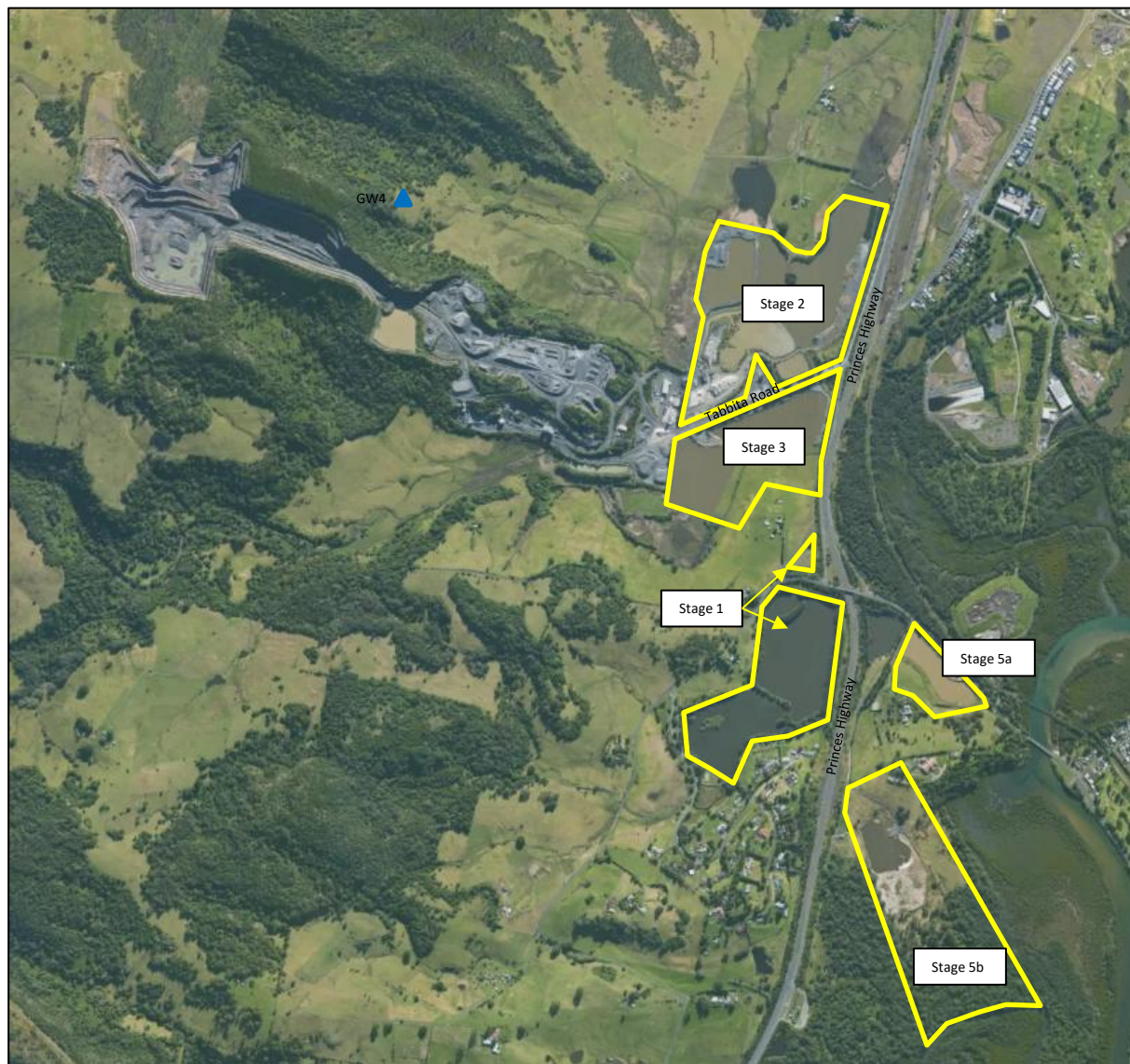
Source: MetroMap
Image Dated 24/06/25



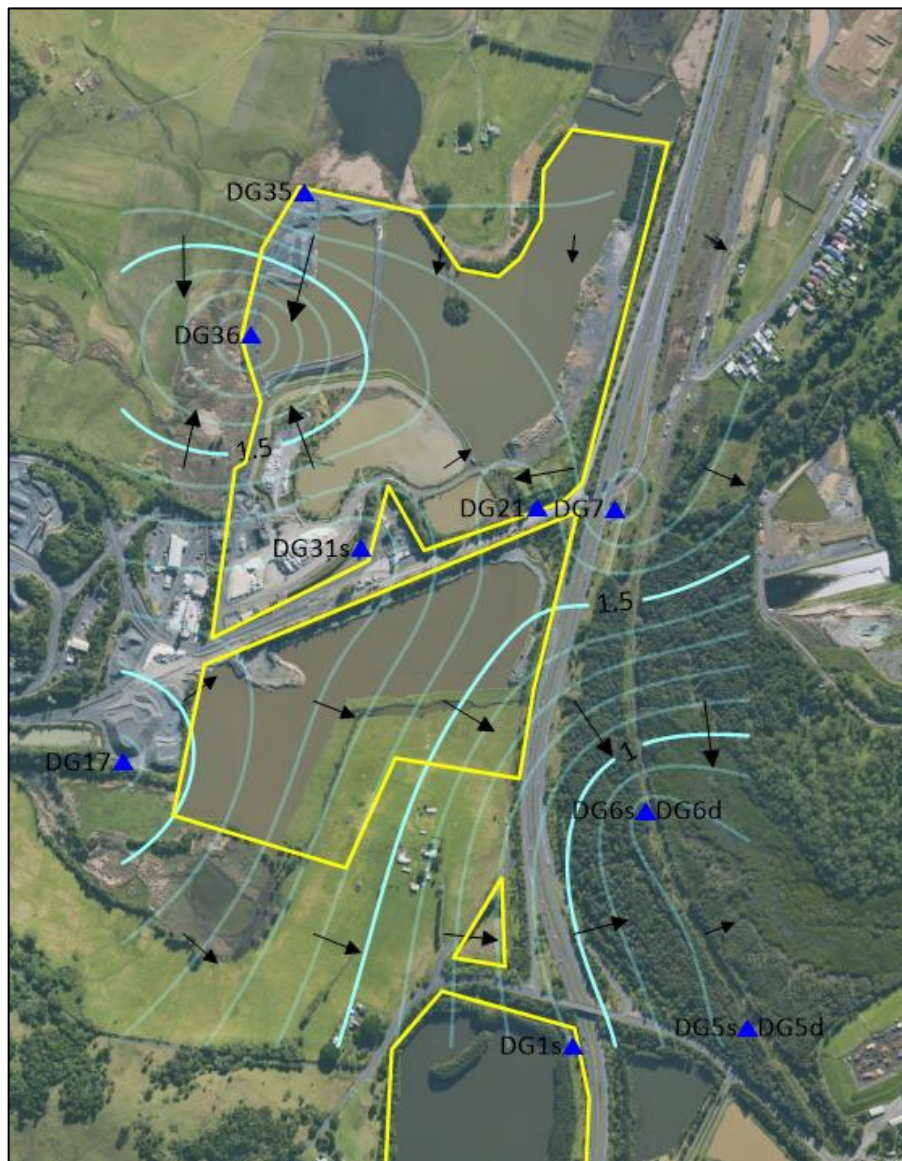
Source: MetroMap 26 June 2025



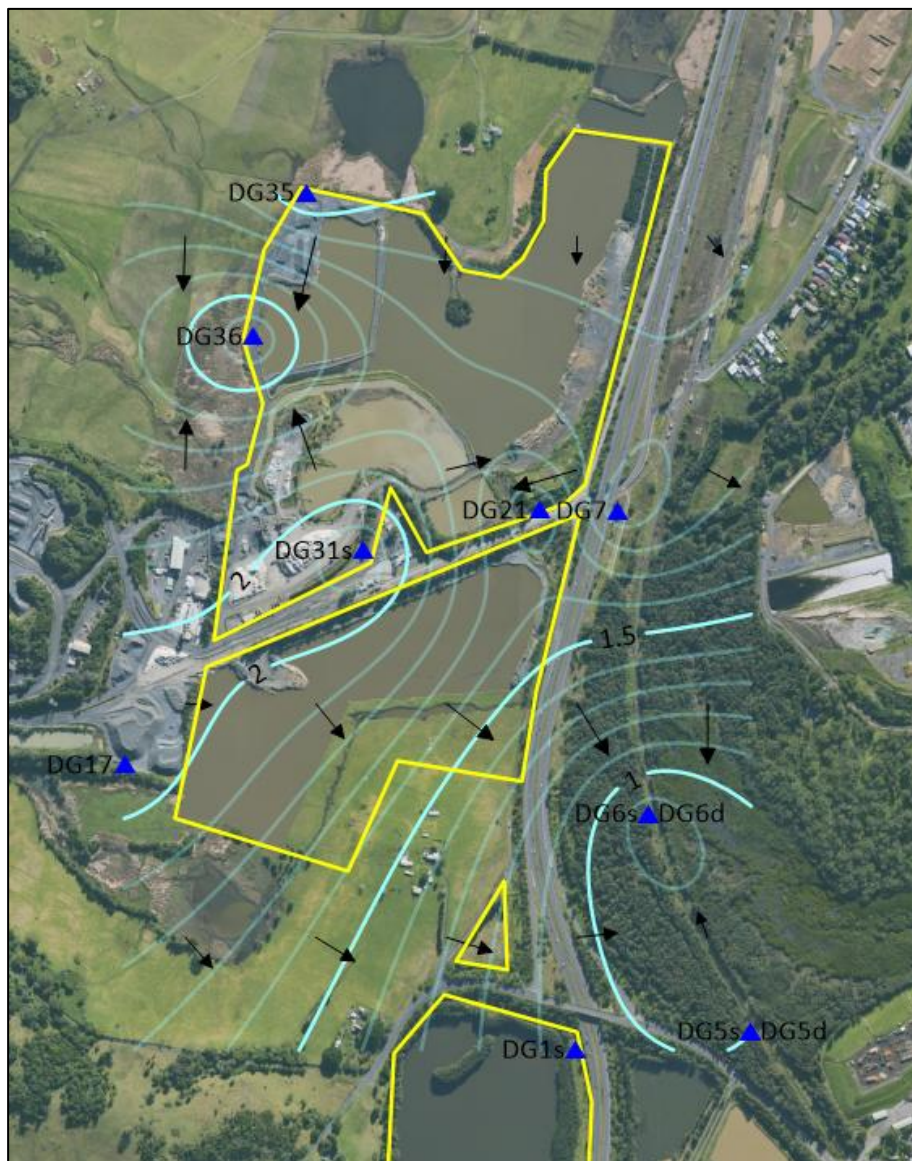
Source: MetroMap 24 June 2025



Source: MetroMap
Image Dated 24/06/25



Source: MetroMap 24 June 2025



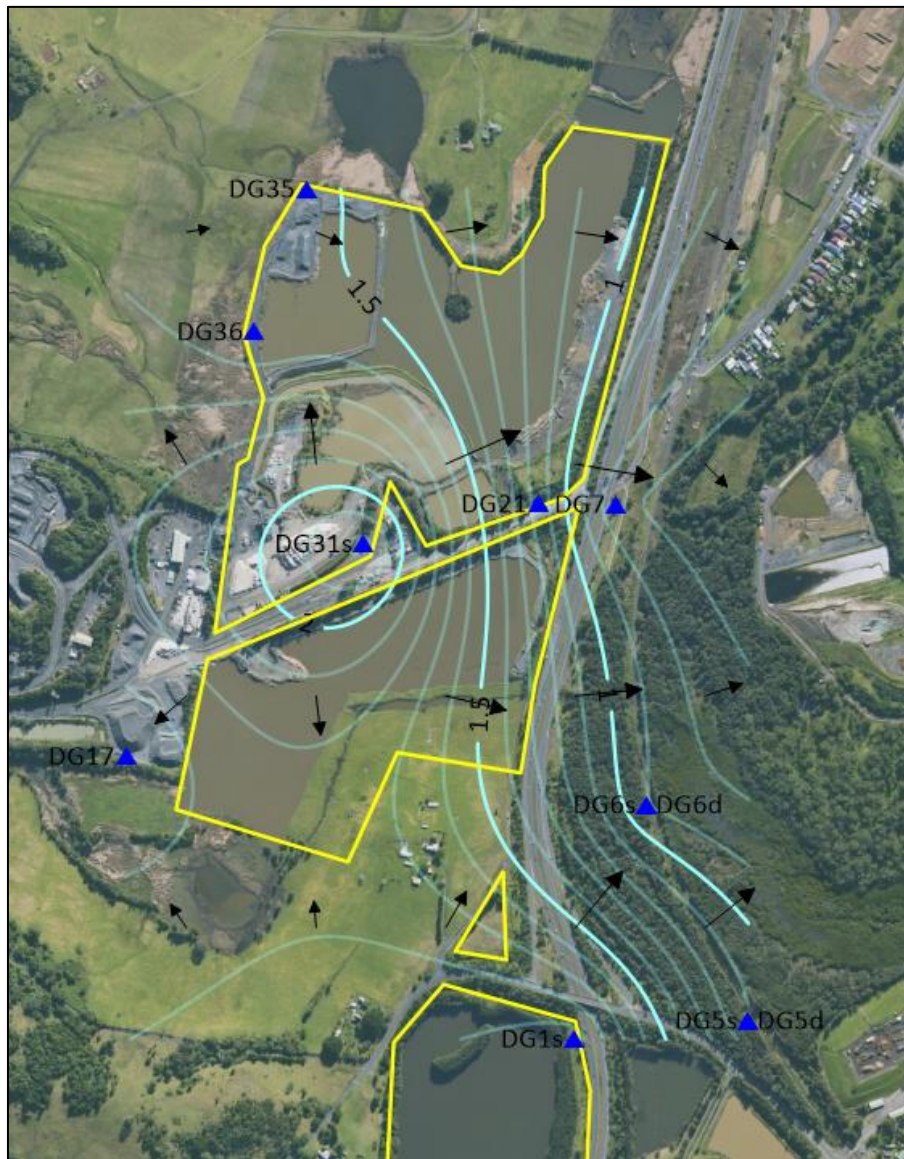
Source: MetroMap 24 June 2025



Source: MetroMap 24 June 2025

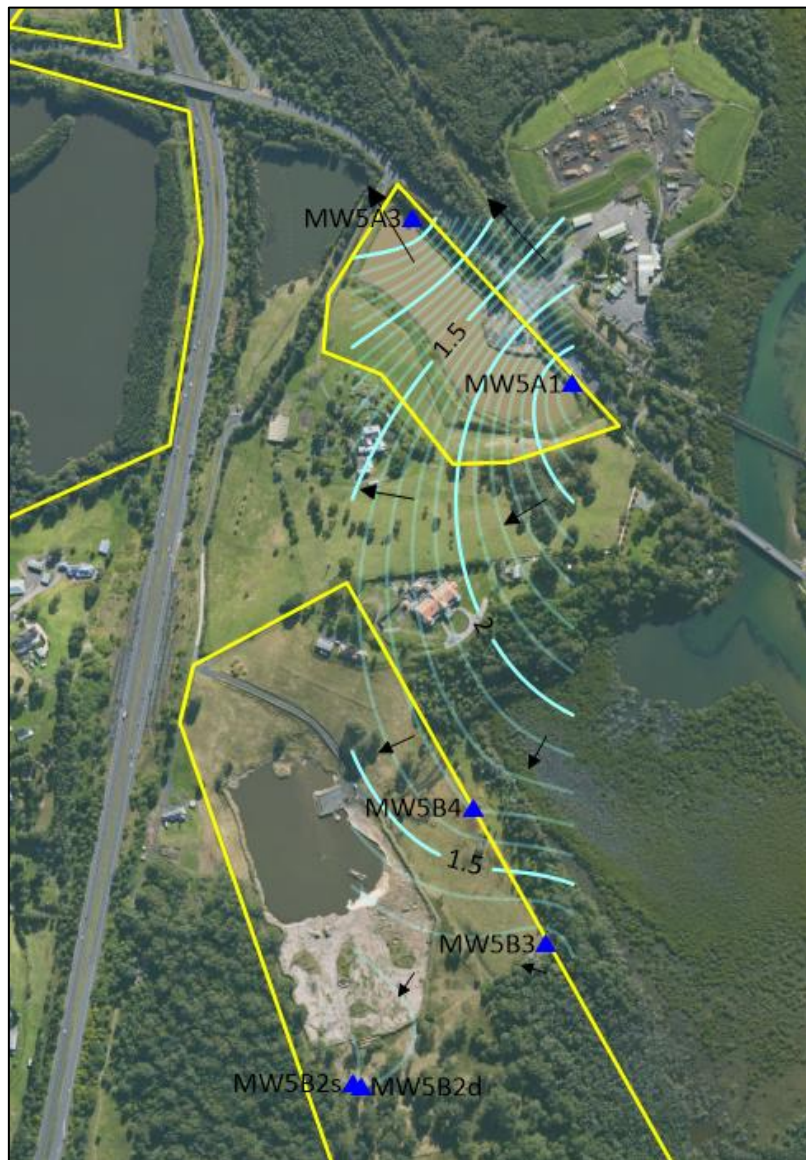


Source: MetroMap 24 June 2025



DG5s not considered in flow direction calculation due to apparent anomalous measured depth to water.

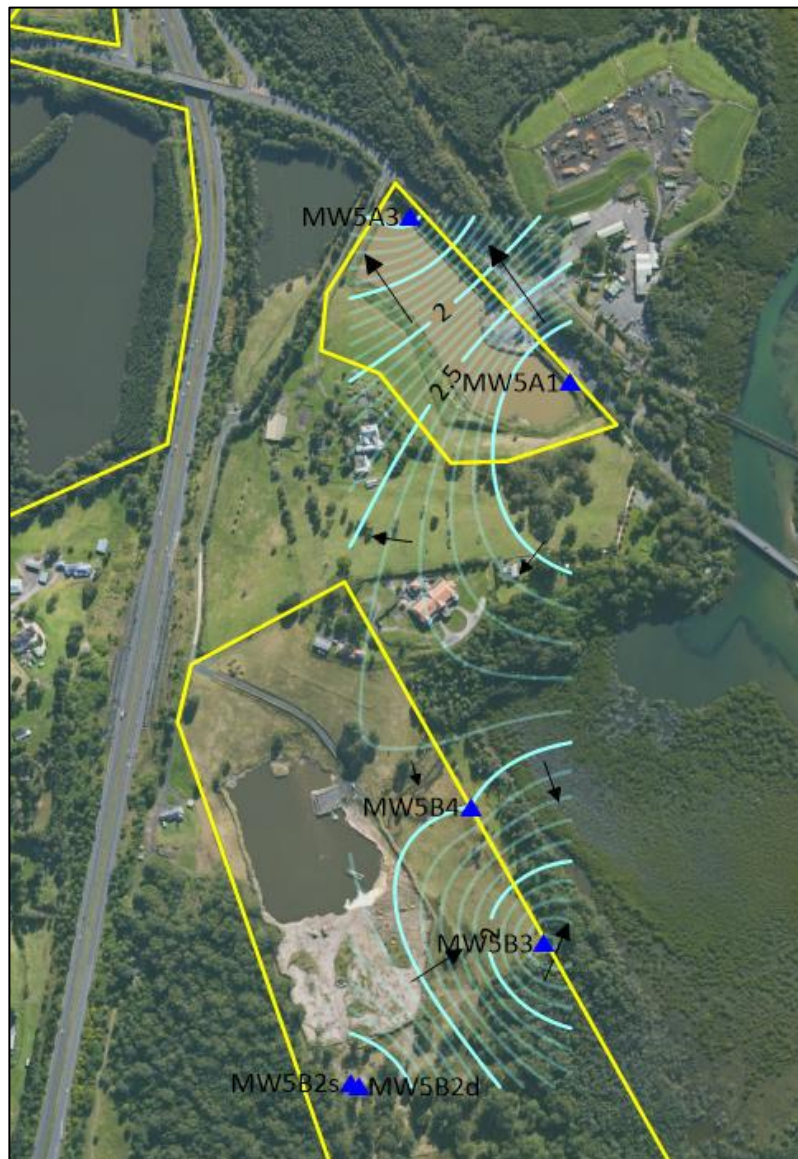
Source: MetroMap 24 June 2025



Source: MetroMap 24 June 2025



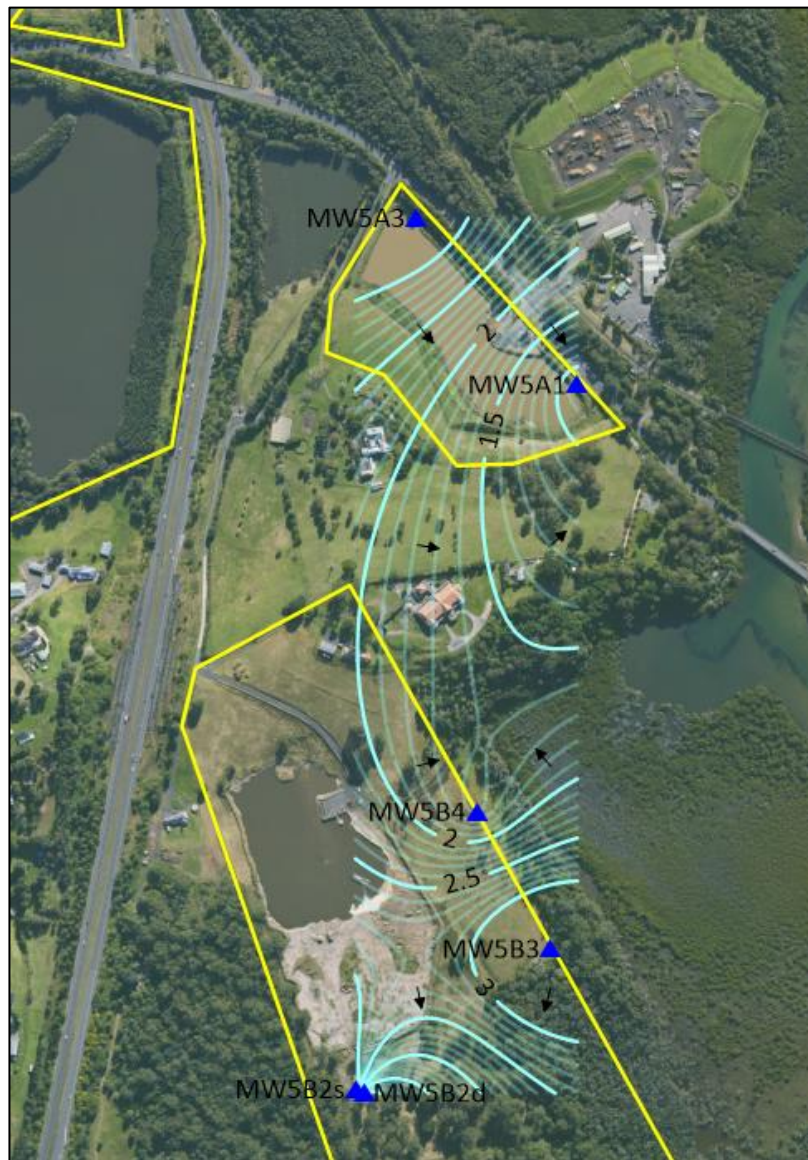
Source: MetroMap 24 June 2025



Source: MetroMap 24 June 2025



Source: MetroMap 24 June 2025



Source: MetroMap 24 June 2025

Appendix A

Groundwater Level Data

Groundwater Monitoring Well Network - Dunmore Sand & Soil, 38 Tabbita Road, Dunmore, NSW								
Monitoring Well ID	Easting	Northing	Total Well Depth (mBTOC)	TOC Elevation (mAHD)	Screened Interval (mBGL)	Status	Diver Installed	Comments
BHA	301383	616892	5.2	2.225	2.2 – 5.2	Decommissioned	-	-
BHB	301450	6167890	5.1	-	2.1 – 5.1	Decommissioned	-	Decommissioned Nov. 16 due to Stage 3 dredge pond expansion
BHC	301531	6167902	5.2	-	2.2 – 5.2	Decommissioned	-	
BHD	301620	6167901	5.1	1.76	2.1 – 5.1	Decommissioned	-	Decommissioned May 18
BHE	301595	6167932	5.1	-	2.1 – 5.1	Decommissioned	-	Decommissioned Nov. 16 due to Stage 3 dredge pond expansion
BHF	301505	6167931	5.2	2.225	2.2 – 5.2	Decommissioned	-	Decommissioned Feb. 18
DG1	301665	6167434	-	2.225	-	Active	Yes	DG1-s included within active bore network in Aug. 19
DG2	301665	6167434	-	2.598	-	Inactive	-	Monitoring ceased due to completion of Stage 1 area
DG3	302005	6167259	-	1.866	-	Inactive	-	
DG4	301966	6167408	-	2.083	-	Inaccessible	-	Inaccessible. Removed from monitoring well network
DG5s	301883	6167521	7	1.717	4.0 – 7.0	Active	-	Nested bores
DG5d	301883	6167521	15	1.717	11.0 – 15.0	Active	Yes	
DG6s	301844	6167628	6.7	1.647	4.0 – 6.7	Active	Yes	Nested bores
DG6d	301844	6167628	14.3	1.647	10.0 – 14.3	Active	-	
DG7	301667	6168216	5	3.17	2.0 – 5.0	Active	-	-
DG17	301021	6167836	6	3.49	2.8 – 6.0	Active	Yes	-
DG21	301424	6168196	5	2.12	2.0 – 5.0	Active	Yes	-
DG31s	301301	6168176	5.5	3.05	2.5 – 5.5	Active	Yes	-
DG35	301473	6168647	8	3.84	4.0 – 8.0	Active	-	-
DG36	301473	6168647	8	2.31	5.0 – 8.0	Active	Yes	-
DG54	301403	6167969	11.5	2.311	-	Decommissioned	-	Decommissioned in 2017/2018 due to Stage 3 dredge pond expansion
DG56	301639	6168017	10.5	1.369	-	Decommissioned	-	
DG59	301125	6167718	8.69	1.763	-	Decommissioned	-	
DG60	301275	6167683	1.9	1.501	-	Decommissioned	-	
GW4	300038	6168813	-	-	-	Active	Yes	Well installation details not available
Lower Dam	300801	6167833	-	-	-	Decommissioned	-	Decommissioned prior to Aug. 21
Rocklow Creek	300546	6167880	-	-	-	Decommissioned	-	
Middle Dam	-	-	-	-	-	Inactive	-	-
MW5A1	302269	6166996	7.25	4.31	3.25 – 7.25	Active	Yes	Provides background data
MW5A2	302103	6166973	6	3.24	2.0 – 6.0	Inactive	-	Destroyed May 22, provided background data
MW5A3	302054	6167198	12	1.74	3.0 – 6.0 / 9.0 – 12.0	Active	Yes	Provides background data
MW5B1	301887	6166442	6	4.07	2.0 – 6.0	Inactive	-	Extraction pond situated on top of bore
MW5B2s	302004	6066039	6.69	3.93	2.0 – 6.0	Active	Yes	Provides background data
MW5B2d	302004	6066038	10.25	4.12	6.5 – 10.25	Active	Yes	Provides background data
MW5B3	302247	6066272	11.2	2.06	3.0 – 6.0 / 8.5 – 11.2	Active	-	Provides background data
MW5B4	302157	6166438	6.33	2.56	2.0 – 6.0	Active	-	Provides background data
MW5B5	302131	6165707	12	4.63	3.0 – 6.0 / 9.0 – 12.0	Active	-	Provides background data

Notes: mBTOC - metres below top of casing
mAHD - metres relative to Australian Height Datum
mBGL - metres below ground level

Well Gauging Sheet - Dunmore Sand & Soil, 38 Tabbita Road, Dunmore, NSW												
Monitoring Well ID	Trigger Value (per GMMP) (mAHD)	Date	Time	Total Well Depth (mBTOC)	Screened Interval (mBGL)	Depth to Water (mBTOC)	TOC Elevation (mAHD)	WT Elevation (mAHD)	Temperature °C	pH (pH unit)	Electrical Conductivity EC (µS/cm)	Redox ORP (mV)
DG17	-	21/06/2024	08:20	6.00	2.8 – 6.0	2.14	3.49	1.35	15.87	7.19	2010	121
		16/07/2024	09:30			1.66		1.83	17.04	7.12	2450	13
		23/08/2024	10:15			2.08		1.41	18.54	7.02	277	18
		24/09/2024	08:30			1.55		1.94	18.08	7.03	283	5
		22/10/2024	08:40			2.65		0.84	17.43	7.77	223	49
		19/11/2024	08:15			2.8		0.69	17.52	8.38	244	77
		18/12/2024	08:25			2.35		1.14	18.3	7.49	1780	258
		22/01/2025	08:00			2.3		1.19	19.28	7.9	2010	274
		18/02/2025	08:05			2.5		0.99	18.96	7.46	2190	45
		18/03/2025	08:05			2.75		0.74	18.6	8.8	2720	154
		24/04/2025	08:10			2.25		1.24	19.86	6.97	1740	155
		20/05/2025	08:30			1.6		1.89	19.01	6.93	2050	299
		19/06/2025	07:42			-		-	15.93	6.91	2580	231
DG1s	0.32 - 2.31	21/06/2024	10:10	-	-	1.1	2.25	1.15	16.24	7.74	502	-31
		16/07/2024	08:15			1.1		1.15	15.41	7.99	1170	-89
		23/08/2024	12:00			1.05		1.20	20.18	7.65	505	51
		24/09/2024	10:20			1.3		0.95	18.8	6.56	565	200
		22/10/2024	11:00			1.4		0.85	19.99	6.83	539	241
		19/11/2024	10:15			1.37		0.88	17.92	7.26	514	129
		18/12/2024	10:00			1.3		0.95	18.15	8	521	1.75
		22/01/2025	10:05			1.25		1.00	19.81	7.91	494	161
		18/02/2025	10:20			1.25		1.00	19.38	7.34	544	23
		18/03/2025	10:05			1.45		0.80	19.22	7.81	623	86
		24/04/2025	11:00			1.15		1.10	19.57	7.48	547	139
		20/05/2025	10:50			1.11		1.14	19.39	7.44	564	49
		19/06/2025	13:31			-		-	18.46	7.63	510	91
DG21	-	21/06/2024	09:00	5.00	2.0 – 5.0	1.5	2.12	0.62	16.61	6.75	772	76
		16/07/2024	10:15			1.51		0.61	15.95	6.78	802	14
		23/08/2024	11:10			1.5		0.62	17.81	6.71	932	54
		24/09/2024	09:15			1.72		0.40	17.86	6.31	119	160
		22/10/2024	09:10			1.8		0.32	17.61	6.32	112	124
		19/11/2024	09:00			1.7		0.42	17.36	6.67	895	56
		18/12/2024	09:00			1.79		0.33	18.28	7.3	947	101
		22/01/2025	08:40			1.6		0.52	19.31	7.39	947	106
		18/02/2025	08:55			1.65		0.47	19.56	6.57	946	-31
		18/03/2025	08:45			1.8		0.32	19.22	7.53	948	32
		24/04/2025	09:10			1.5		0.62	20.31	7.25	946	85
		20/05/2025	09:27			1.51		0.61	18.95	7.09	898	109
		19/06/2025	08:58			-		-	17.09	6.87	906	85

Well Gauging Sheet - Dunmore Sand & Soil, 38 Tabbita Road, Dunmore, NSW												
Monitoring Well ID	Trigger Value (per GMP) (mAHD)	Date	Time	Total Well Depth (mBTOC)	Screened Interval (mBGL)	Depth to Water (mBTOC)	TOC Elevation (mAHD)	WT Elevation (mAHD)	Temperature °C	pH (pH unit)	Electrical Conductivity EC (µS/cm)	Redox ORP (mV)
DG31s	-	21/06/2024	08:50	5.50	2.5 – 5.5	1.9	3.05	1.15	14.74	7.09	355	72
		16/07/2024	10:00			1.97		1.08	15.27	7.25	409	-74
		23/08/2024	11:00			2.2		0.85	17.63	7.02	487	-1
		24/09/2024	09:00			2.25		0.80	17.42	6.23	801	24
		22/10/2024	09:05			2.25		0.80	17.15	6.45	914	82
		19/11/2024	09:15			2.2		0.85	17.36	6.72	985	5
		18/12/2024	08:55			2.1		0.95	18.55	7.4	864	16
		22/01/2025	08:30			2.2		0.85	19.48	7.62	954	70
		18/02/2025	08:45			2.2		0.85	20.06	6.68	774	-44
		18/03/2025	08:35			2.35		0.70	19.8	7.9	864	-10
		24/04/2025	09:00			2		1.05	20.62	7.22	639	22
		20/05/2025	09:15			1.55		1.50	19.57	7.1	621	47
		19/06/2025	08:42			-		-	16.37	7.12	332	2
DG35	-	21/06/2024	08:40	8.00	4.0 – 8.0	1.91	3.84	1.93	16.14	6.84	1050	-88
		16/07/2024	09:50			1.95		1.89	16	7.16	1000	-63
		23/08/2024	10:50			2.1		1.74	17.48	6.93	1020	-93
		24/09/2024	08:50			2.3		1.54	17.65	6.43	975	-43
		22/10/2024	09:00			2.15		1.69	17.11	6.7	103	-41
		19/11/2024	08:30			1.45		2.39	16.45	7.66	971	55
		18/12/2024	08:45			2.04		1.80	17.61	7.51	964	-14
		22/01/2025	08:18			2		1.84	18.16	7.66	984	12
		18/02/2025	08:35			2.05		1.79	18.14	6.86	961	-86
		18/03/2025	08:25			2.3		1.54	17.5	8.15	967	31
		24/04/2025	08:45			2.12		1.72	18.5	7.21	982	-20
		20/05/2025	9:03			2.24		1.60	17.76	6.9	996	-11
		19/06/2025	08:24			-		-	15.45	6.94	1030	37
DG36	-	21/06/2024	08:30	8.00	5.0 – 8.0	1.07	2.31	1.24	14.8	7.26	1450	60
		16/07/2024	09:45			1.16		1.15	15.61	7.65	1040	104
		23/08/2024	10:40			1.3		1.01	17.4	7.34	902	107
		24/09/2024	08:40			1.4		0.91	17	6.92	913	100
		22/10/2024	08:50			1.5		0.81	16.55	7.06	914	89
		19/11/2024	08:40			2.2		0.11	17.15	6.76	992	-83
		18/12/2024	08:35			1.4		0.91	17.02	7.8	1070	197
		22/01/2025	08:08			1.35		0.96	17.73	8.04	1070	204
		18/02/2025	08:20			1.4		0.91	17.99	6.84	1070	-36
		18/03/2025	08:15			1.59		0.72	16.93	8.66	1020	77
		24/04/2025	08:35			1.21		1.10	18.03	7.3	987	128
		20/05/2025	08:51			1.16		1.15	17.38	7.29	1020	136
		19/06/2025	08:10			-		-	14.25	7.35	1120	87

Well Gauging Sheet - Dunmore Sand & Soil, 38 Tabbita Road, Dunmore, NSW												
Monitoring Well ID	Trigger Value (per GMP) (mAHD)	Date	Time	Total Well Depth (mBTOC)	Screened Interval (mBGL)	Depth to Water (mBTOC)	TOC Elevation (mAHD)	WT Elevation (mAHD)	Temperature °C	pH (pH unit)	Electrical Conductivity EC (µS/cm)	Redox ORP (mV)
DG5d	0.17 - 1.91	21/06/2024	10:30	15.00	11.0 – 15.0	0.8	1.717	0.92	16.49	7.51	15000	-104
		16/07/2024	07:45			0.84		0.88	16.03	7.79	1670	-91
		23/08/2024	09:05			1.1		0.62	16.97	7.58	1770	-19
		24/09/2024	10:35			1.2		0.52	18.08	6.66	2010	-48
		22/10/2024	11:10			1.2		0.52	18.96	6.65	1520	-21
		19/11/2024	11:00			1.1		0.62	17.98	7.06	1550	-35
		18/12/2024	10:20			1.1		0.62	18.1	6.98	14100	-31
		22/01/2025	10:25			0.98		0.74	18.6	6.89	15000	83
		18/02/2025	10:40			0.95		0.77	18.64	6.29	14400	-78
		18/03/2025	10:30			1.2		0.52	18.4	6.88	17100	37
		24/04/2025	11:10			0.9		0.82	18.79	6.95	15100	30
		20/05/2025	11:18			0.82		0.90	18.59	6.89	14800	64
		19/06/2025	10:50			-		-	16.63	7.04	15900	145
DG5s	-	21/06/2024	10:25	7.00	4.0 – 7.0	0.75	1.717	0.97	16.78	7.64	2060	-99
		16/07/2024	07:40			0.79		0.93	16.11	7.46	15400	-99
		23/08/2024	09:00			1		0.72	16.75	7.94	1630	-3
		24/09/2024	10:30			1.1		0.62	18.25	6.57	898	150
		22/10/2024	01:05			0.75		0.97	18.62	6.63	902	9
		19/11/2024	10:50			1.01		0.71	17.21	7.68	156	-67
		18/12/2024	10:10			1		0.72	18.99	7.49	916	10
		22/01/2025	10:25			0.85		0.87	19.16	7.79	915	125
		18/02/2025	10:40			0.55		1.17	19.27	7.17	913	-36
		18/03/2025	10:25			1.2		0.52	18.94	7.74	924	46
		24/04/2025	11:05			0.84		0.88	19.62	7.36	911	51
		20/05/2025	11:16			0.9		0.82	18.99	7.53	904	102
		19/06/2025	10:53			-		-	17.14	7.71	1680	-7
DG6d	-	21/06/2024	10:40	14.30	10.0 – 14.3	0.93	1.647	0.72	16.37	6.99	30400	-47
		16/07/2024	08:05			0.88		0.77	15.82	6.85	30000	-40
		23/08/2024	09:20			0.83		0.82	16.39	6.99	1910	-13
		24/09/2024	10:45			0.78		0.87	17.44	6.45	2850	62
		22/10/2024	11:20			0.8		0.85	17.85	6.49	2850	54
		19/11/2024	11:40			0.92		0.73	16.99	6.49	2930	16
		18/12/2024	10:40			0.93		0.72	18.08	6.88	28400	19
		22/01/2025	10:40			0.86		0.79	19.01	7.12	28900	37
		18/02/2025	11:00			1		0.65	18.81	6.77	29300	-94
		18/03/2025	10:45			1.1		0.55	18.72	7.3	29300	5
		24/04/2025	11:30			0.8		0.85	18.84	7.02	29100	7
		20/05/2025	11:40			0.82		0.83	18.2	6.75	28200	19
		19/06/2025	11:23			-		-	17.35	6.74	27200	62

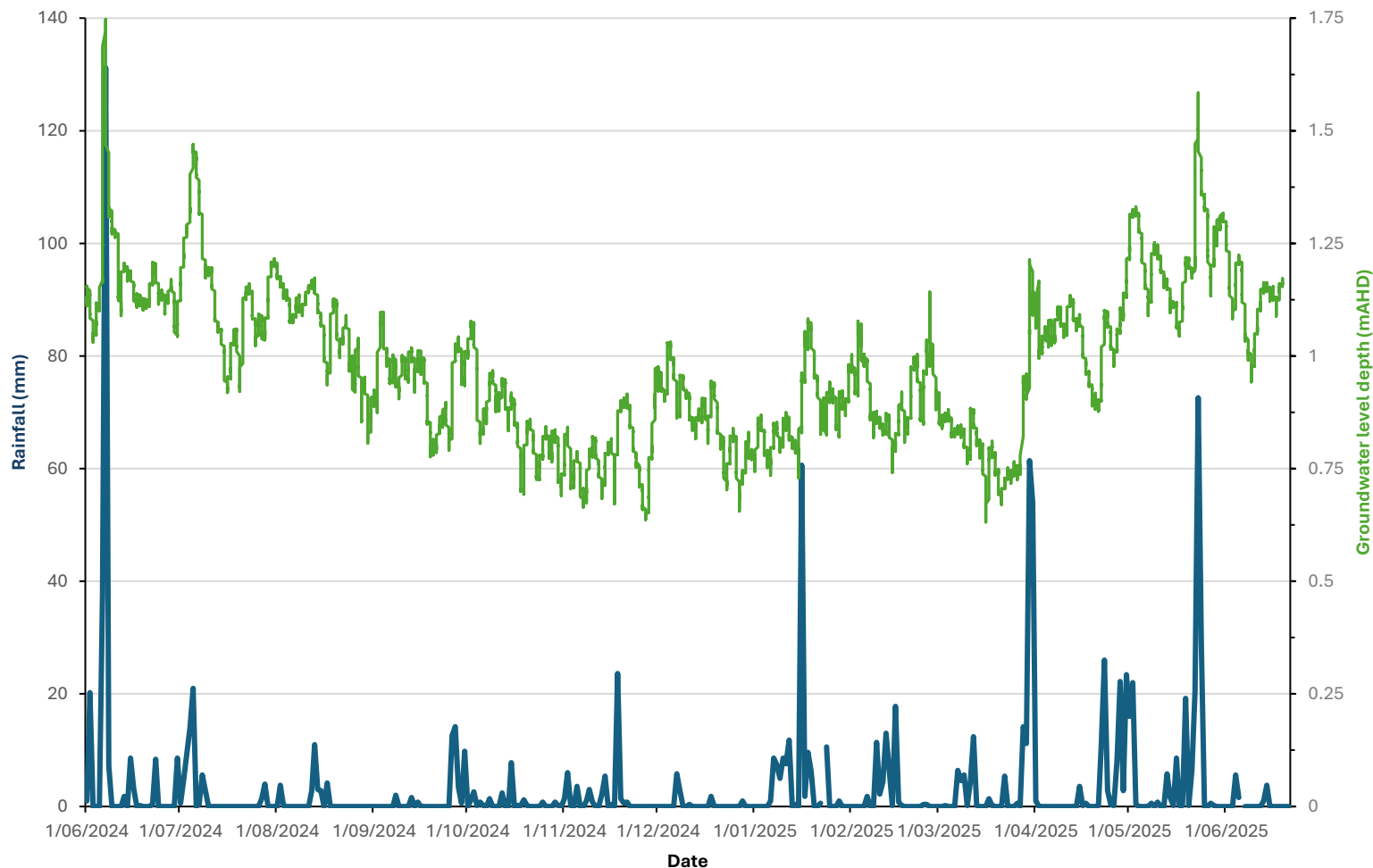
Well Gauging Sheet - Dunmore Sand & Soil, 38 Tabbita Road, Dunmore, NSW												
Monitoring Well ID	Trigger Value (per GMP) (mAHD)	Date	Time	Total Well Depth (mBTOC)	Screened Interval (mBGL)	Depth to Water (mBTOC)	TOC Elevation (mAHD)	WT Elevation (mAHD)	Temperature °C	pH (pH unit)	Electrical Conductivity EC (µS/cm)	Redox ORP (mV)
DG6s	-	21/06/2024	10:35	6.70	4.0 – 6.7	0.75	1.647	0.90	16.71	6.82	19600	86
		16/07/2024	08:00			0.8		0.85	15.88	6.65	18600	89
		23/08/2024	09:15			0.84		0.81	16.68	7.21	3090	-72
		24/09/2024	10:40			0.73		0.92	17.74	6.67	1760	88
		22/10/2024	11:15			0.55		1.10	18.11	6.6	1580	85
		19/11/2024	11:30			0.85		0.80	17.1	6.39	1780	76
		18/12/2024	10:30			0.78		0.87	18.04	7.07	16200	44
		22/01/2025	10:35			0.79		0.86	18.55	7.53	17700	11
		18/02/2025	11:05			0.9		0.75	18.75	7.13	18800	-124
		18/03/2025	10:40			1		0.65	19.04	7.3	18500	22
		24/04/2025	11:20			0.75		0.90	19.02	6.93	18800	-60
		20/05/2025	11:30			0.72		0.93	18.59	6.8	18200	75
		19/06/2025	11:18			-		-	17.07	6.84	16300	103
DG7	-	21/06/2024	09:10	5.00	2.0 – 5.0	1.86	3.170	1.31	16.6	7.12	656	52
		16/07/2024	09:25			1.8		1.37	16.25	7.52	701	82
		23/08/2024	13:20			1.98		1.19	19.47	7.37	684	136
		24/09/2024	09:30			2.18		0.99	18.73	6.21	723	188
		22/10/2024	09:15			2.1		1.07	18.62	6.06	698	170
		19/11/2024	08:50			2.1		1.07	18.1	6.97	654	83
		18/12/2024	09:05			2.1		1.07	19.17	7.55	633	137
		22/01/2025	08:50			1.95		1.22	20.28	7.67	634	141
		18/02/2025	09:10			2.1		1.07	20.54	6.84	700	11
		18/03/2025	08:50			2.2		0.97	20.1	7.8	700	72
		24/04/2025	09:20			1.9		1.27	20.84	7.29	705	85
		20/05/2025	09:30			1.95		1.22	19.7	7.18	671	120
		19/06/2025	09:21			-		-	16.42	7.05	679	90
GW4	-	21/06/2024	19:40	-	-	2.82	-	-	16.7	7.56	906	-138
		16/07/2024	19:12			2.8		-	15.47	7.89	964	161
		23/08/2024	12:00			3.5		-	22.43	7.44	911	189
		24/09/2024	22:33			2.94		-	21.02	6.57	901	232
		22/10/2024	0:00			3		-	20.34	6.71	884	237
		19/11/2024	4:48			3.2		-	19	7.44	883	148
		18/12/2024	4:48			3.2		-	20.45	7.7	895	174
		22/01/2025	4:48			3.2		-	23.22	7.82	883	159
		18/02/2025	20:24			2.85		-	21.56	7.33	893	3
		18/03/2025	7:12			3.3		-	20.2	7.7	890	73
		24/04/2025	2:24			3.1		-	21.23	7.63	881	99
		20/05/2025	20:38			2.86		-	19.88	7.35	777	127
		19/06/2025	10:05			-		-	17.02	7.37	913	89

Well Gauging Sheet - Dunmore Sand & Soil, 38 Tabbita Road, Dunmore, NSW												
Monitoring Well ID	Trigger Value (per G MMP) (mAHD)	Date	Time	Total Well Depth (mBTOC)	Screened Interval (mBGL)	Depth to Water (mBTOC)	TOC Elevation (mAHD)	WT Elevation (mAHD)	Temperature °C	pH (pH unit)	Electrical Conductivity EC (µS/cm)	Redox ORP (mV)
MW5A1	-	21/06/2024	11:00	7.25	3.25 – 7.25	2.84	4.31	1.47	18.6	7.51	957	-11
		16/07/2024	06:50			3		1.31	15.66	8.05	279	67
		23/08/2024	09:45			3.3		1.01	16.45	7.77	913	-66
		24/09/2024	11:15			3.55		0.76	18.1	7.8	981	8
		22/10/2024	11:50			3.5		0.81	18.58	8.15	874	-29
		19/11/2024	12:00			3.6		0.71	17.2	7.85	900	-33
		18/12/2024	10:50			3.6		0.71	18.9	8.64	859	23
		22/01/2025	11:00			3.55		0.76	20.93	8.45	876	71
		18/02/2025	11:25			2.9		1.41	20.89	8.37	702	-42
		18/03/2025	11:00			3.75		0.56	19.9	8.96	860	-54
		24/04/2025	11:45			3.05		1.26	20.65	8.24	806	-3
		20/05/2025	11:54			3.5		0.81	19.81	7.58	859	-11
		19/06/2025	11:44			-		-	18.81	7.72	1070	-11
MW5A3	-	21/06/2024	11:15	12.00	3.0 – 6.0 / 9.0 – 12.0	0.28	1.74	1.46	18.86	7.01	448	-3
		16/07/2024	07:00			0.5		1.24	16.3	7.37	360	41
		23/08/2024	10:00			0.7		1.04	16.17	7.39	313	56
		24/09/2024	11:20			0.8		0.94	18.49	6.42	299	42
		22/10/2024	11:55			0.7		1.04	17.39	7.6	998	-1
		19/11/2024	12:10			0.91		0.83	16.05	7.63	291	36
		18/12/2024	11:00			0.84		0.90	18.12	6.54	320	104
		22/01/2025	11:20			0.88		0.86	21.55	8.35	292	112
		18/02/2025	11:35			0.95		0.79	19.41	7.71	272	-101
		18/03/2025	11:20			1.1		0.64	19.5	8.71	293	44
		24/04/2025	11:50			0.84		0.90	19.25	7.72	261	32
		20/05/2025	12:04			0.75		0.99	18.54	6.99	286	42
		19/06/2025	12:00			-		-	17.96	7.46	293	51
MW5B2d	-	21/06/2024	12:00	10.25	6.5 – 10.25	1.21	4.12	2.91	19.23	7.23	724	-50
		16/07/2024	07:10			1.42		2.70	16.69	7.34	752	-72
		23/08/2024	12:30			2.8		1.32	20.45	7.49	734	-58
		24/09/2024	11:30			2.7		1.42	19.36	6.34	730	-10
		22/10/2024	12:00			3		1.12	18.43	6.66	739	-9
		19/11/2024	12:30			3.35		0.77	17.84	7.13	721	-34
		18/12/2024	11:00			3.5		0.62	18.87	7.26	730	14
		22/01/2025	11:35			2.85		1.27	20.64	7.95	690	162
		18/02/2025	12:00			1.4		2.72	20.07	7.39	698	-10
		18/03/2025	11:45			3.6		0.52	20.4	7.69	683	-34
		24/04/2025	12:10			3.75		0.37	20.16	7.27	691	0
		20/05/2025	12:28			3.95		0.17	18.98	7.24	667	83
		19/06/2025	12:31			-		-	18.6	7.35	658	23

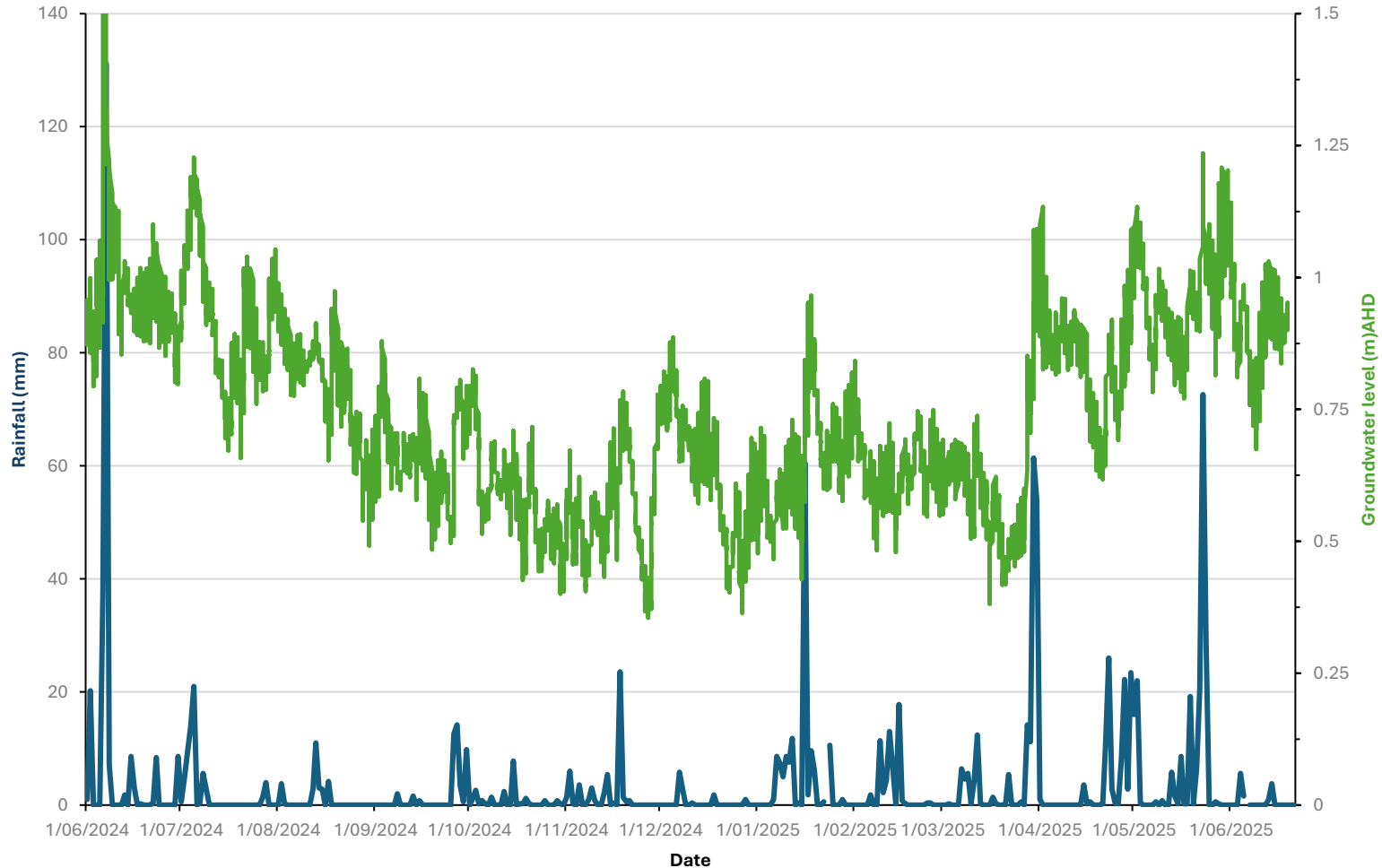
Well Gauging Sheet - Dunmore Sand & Soil, 38 Tabbita Road, Dunmore, NSW												
Monitoring Well ID	Trigger Value (per GMMP) (mAHD)	Date	Time	Total Well Depth (mBTOC)	Screened Interval (mBGL)	Depth to Water (mBTOC)	TOC Elevation (mAHD)	WT Elevation (mAHD)	Temperature °C	pH (pH unit)	Electrical Conductivity EC (µS/cm)	Redox ORP (mV)
MW5B2s	-	21/06/2024	11:50	6.69	2.0 – 6.0	1.02	3.93	2.91	19.4	7.02	650	70
		16/07/2024	07:15			1.42		2.51	16.39	7.38	557	-72
		23/08/2024	12:40			2.3		1.63	18.85	7.37	672	-66
		24/09/2024	11:35			2.6		1.33	18.65	6.38	740	-45
		22/10/2024	12:05			2.8		1.13	18.66	6.74	730	2
		19/11/2024	12:20			3.2		0.73	17.65	7.07	743	32
		18/12/2024	11:10			3.2		0.73	19.44	7.47	713	133
		22/01/2025	11:40			3.4		0.53	21.21	7.59	715	49
		18/02/2025	12:10			3.4		0.53	20.92	7.3	769	-147
		18/03/2025	11:40			3.4		0.53	21.81	7.98	777	74
		24/04/2025	12:15			3.65		0.28	21.22	7.14	787	94
		20/05/2025	12:24			3.75		0.18	19.94	7.08	817	-3
		19/06/2025	12:24			-		-	19.31	7.15	861	97
MW5B3	-	21/06/2024	12:10	11.20	3.0 – 6.0 / 8.5 – 11.2	1.24	2.06	0.82	19.5	7.56	482	-4
		16/07/2024	07:20			1.25		0.81	16.8	7.61	508	6
		23/08/2024	12:50			1.31		0.75	19.54	7.64	412	46
		24/09/2024	11:40			1.45		0.61	19.04	6.56	508	63
		22/10/2024	12:10			1.5		0.56	18.74	6.77	530	27
		19/11/2024	12:40			1.55		0.51	17.92	7.43	524	8
		18/12/2024	11:20			1.49		0.57	18.99	7.59	511	31
		22/01/2025	11:50			1.4		0.66	20.79	7.81	419	86
		18/02/2025	12:15			1.7		0.36	20.49	7.57	506	-78
		18/03/2025	11:55			1.65		0.41	20.7	7.8	545	0
		24/04/2025	12:20			1.6		0.46	20.65	7.61	491	23
		20/05/2025	12:39			1.55		0.51	19.49	7.55	475	14
		19/06/2025	12:48			-		-	19.19	7.65	468	40
MW5B4	-	21/06/2024	12:20	6.33	2.0 – 6.0	1.71	2.56	0.85	18.7	7.52	557	53
		16/07/2024	07:25			1.7		0.86	-	7.55	539	-15
		23/08/2024	13:00			2.37		0.19	18.9	7.68	424	128
		24/09/2024	11:45			2.4		0.16	18.85	6.63	401	106
		22/10/2024	12:15			2.4		0.16	18.57	6.94	411	103
		19/11/2024	12:50			2.5		0.06	17.78	7.55	417	47
		18/12/2024	11:30			2.4		0.16	18.8	7.77	413	73
		22/01/2025	12:00			2.4		0.16	21.04	7.78	401	109
		18/02/2025	12:25			2.55		0.01	20.24	7.79	390	-61
		18/03/2025	12:05			2.5		0.06	20.8	8	386	44
		24/04/2025	12:30			2.4		0.16	20.52	7.75	436	51
		20/05/2025	12:50			2.35		0.21	19.06	7.55	499	48
		19/06/2025	13:01			-		-	18.93	7.63	502	69

Notes: mBTOC - metres below top of casing
mAHD - metres relative to Australian Height Datum
mBGL - metres below ground level

DG1s - Annual Groundwater Levels vs Rainfall - Jun-24 to Jun-25



DG5d - Annual Groundwater Levels vs Rainfall - Jun-24 to Jun-25



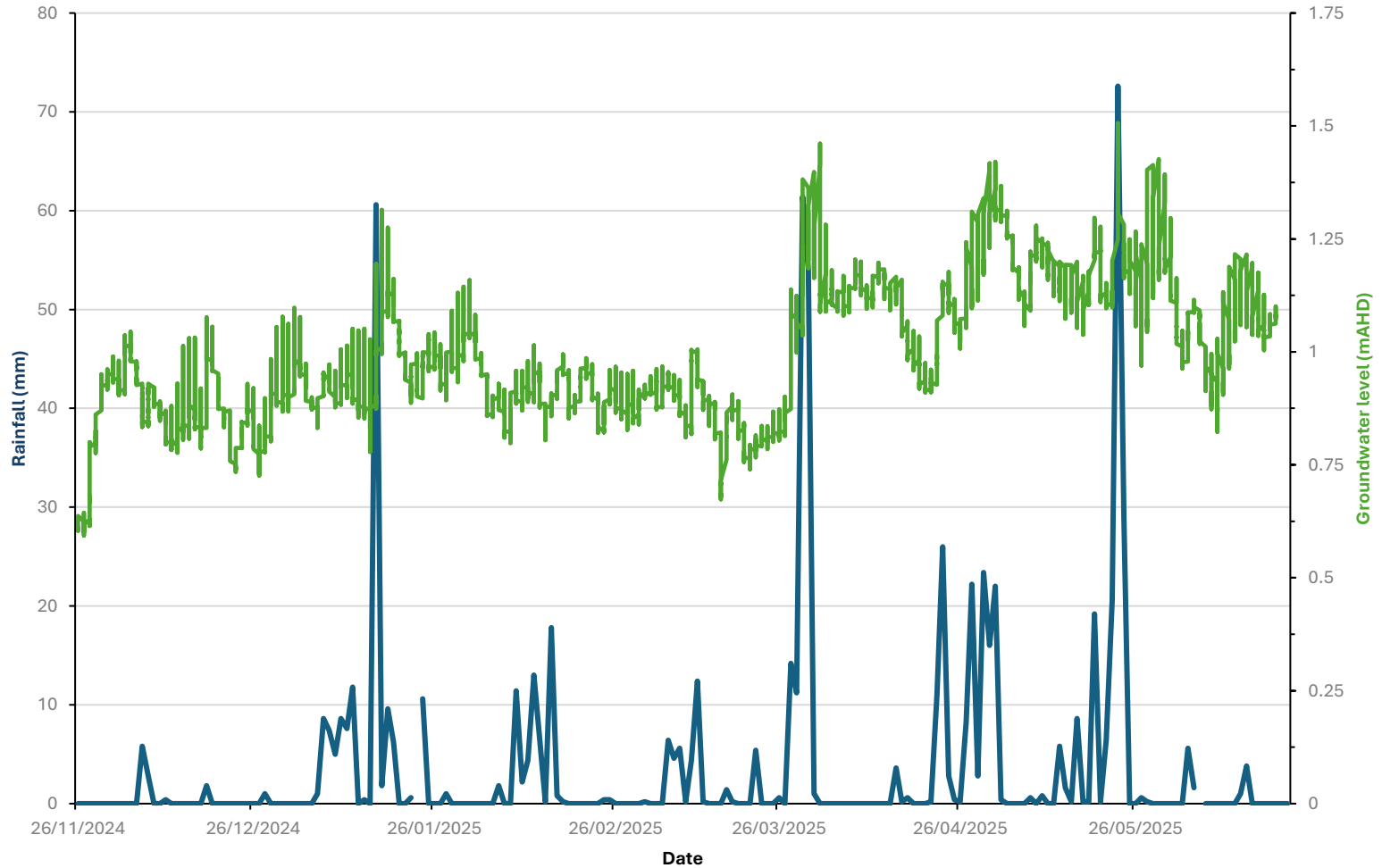
Project: **40.04**

Title: **DG5d – Annual Groundwater Levels vs Rainfall – June 2024 to June 2025**

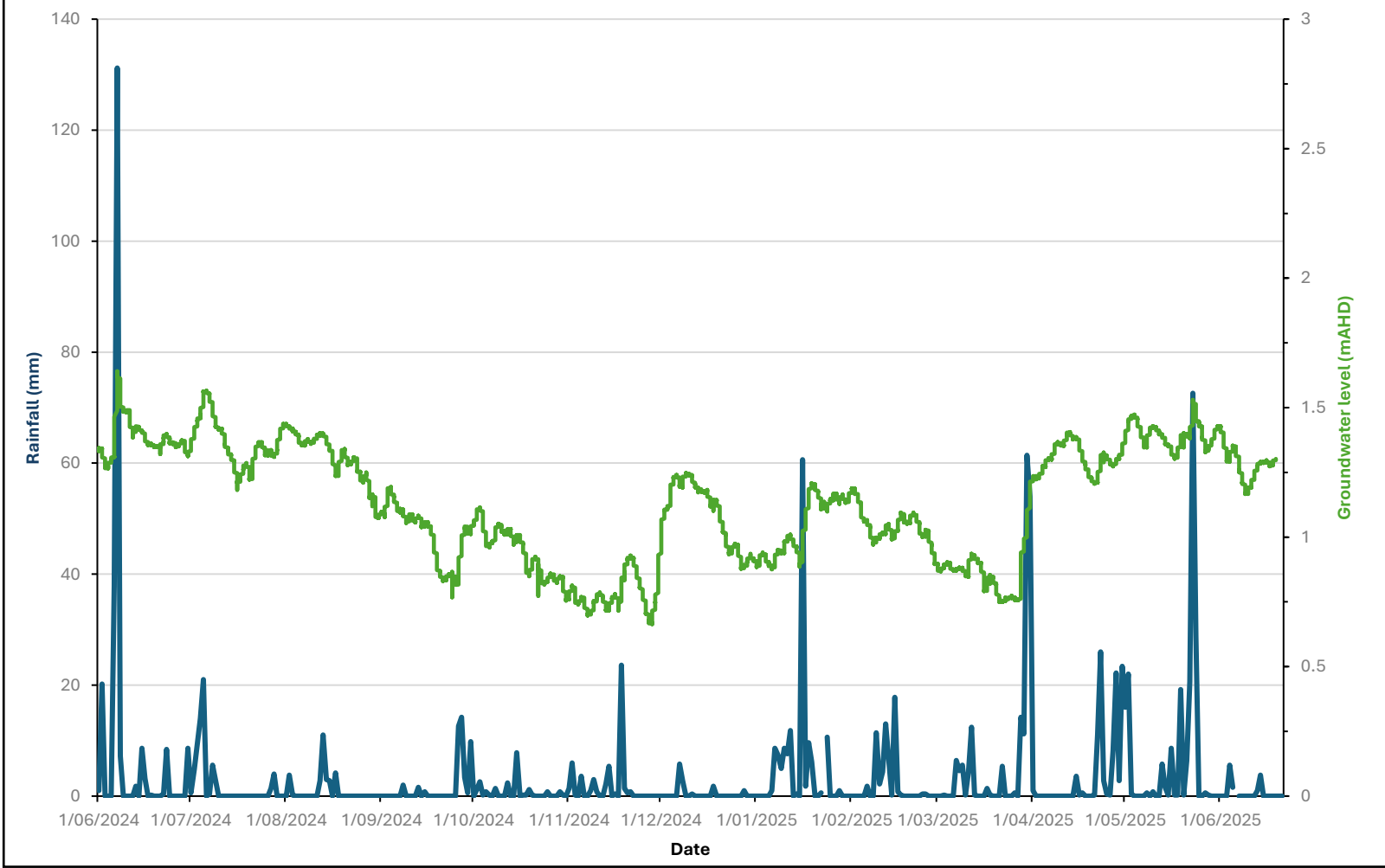
Figure: **A2**

Address: **38 Tabbita Road, Dunmore, NSW**

DG6s - Annual Groundwater Levels vs Rainfall - Nov-24 to Jun-25

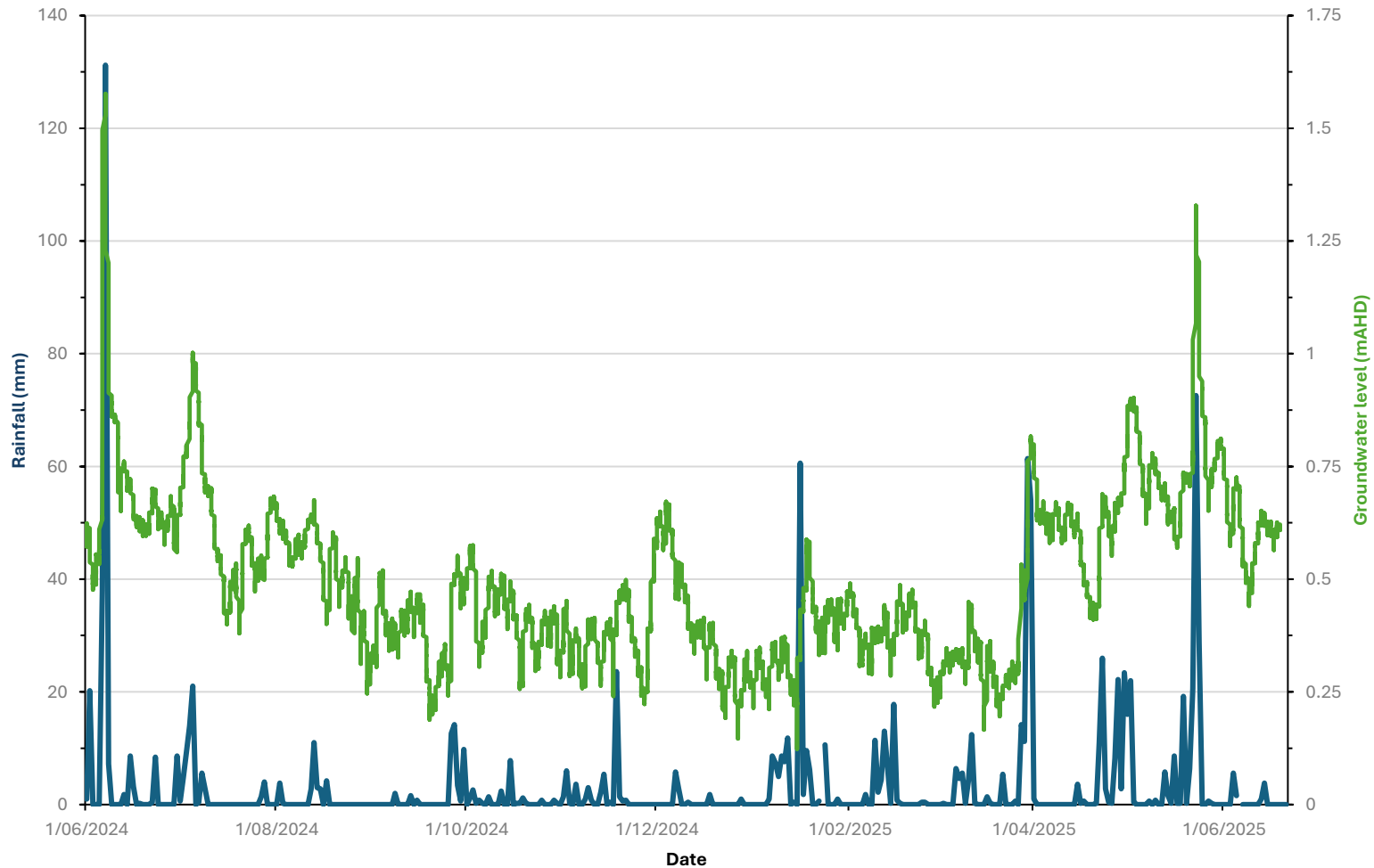


DG17 - Annual Groundwater Levels vs Rainfall - Jun-24 to Jun-25



Project:	40.04	Title:	DG17 – Annual Groundwater Levels vs Rainfall – June 2024 to June 2025
Figure:	A4	Address:	38 Tabbita Road, Dunmore, NSW

DG21 - Annual Groundwater Levels vs Rainfall - Jun-24 to Jun-25



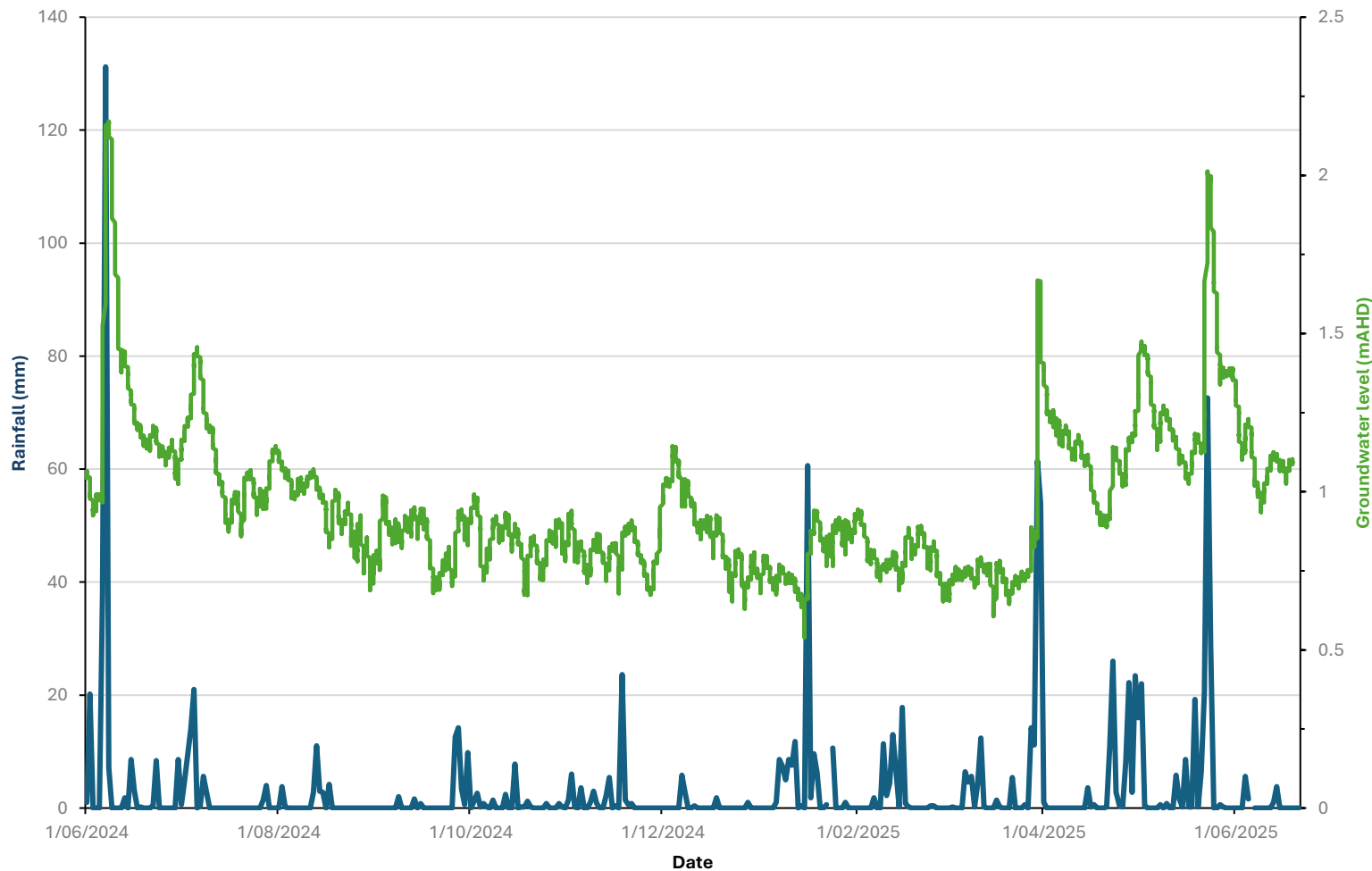
Project: **40.04**

Title: **DG21 – Annual Groundwater Levels vs Rainfall – June 2024 to June 2025**

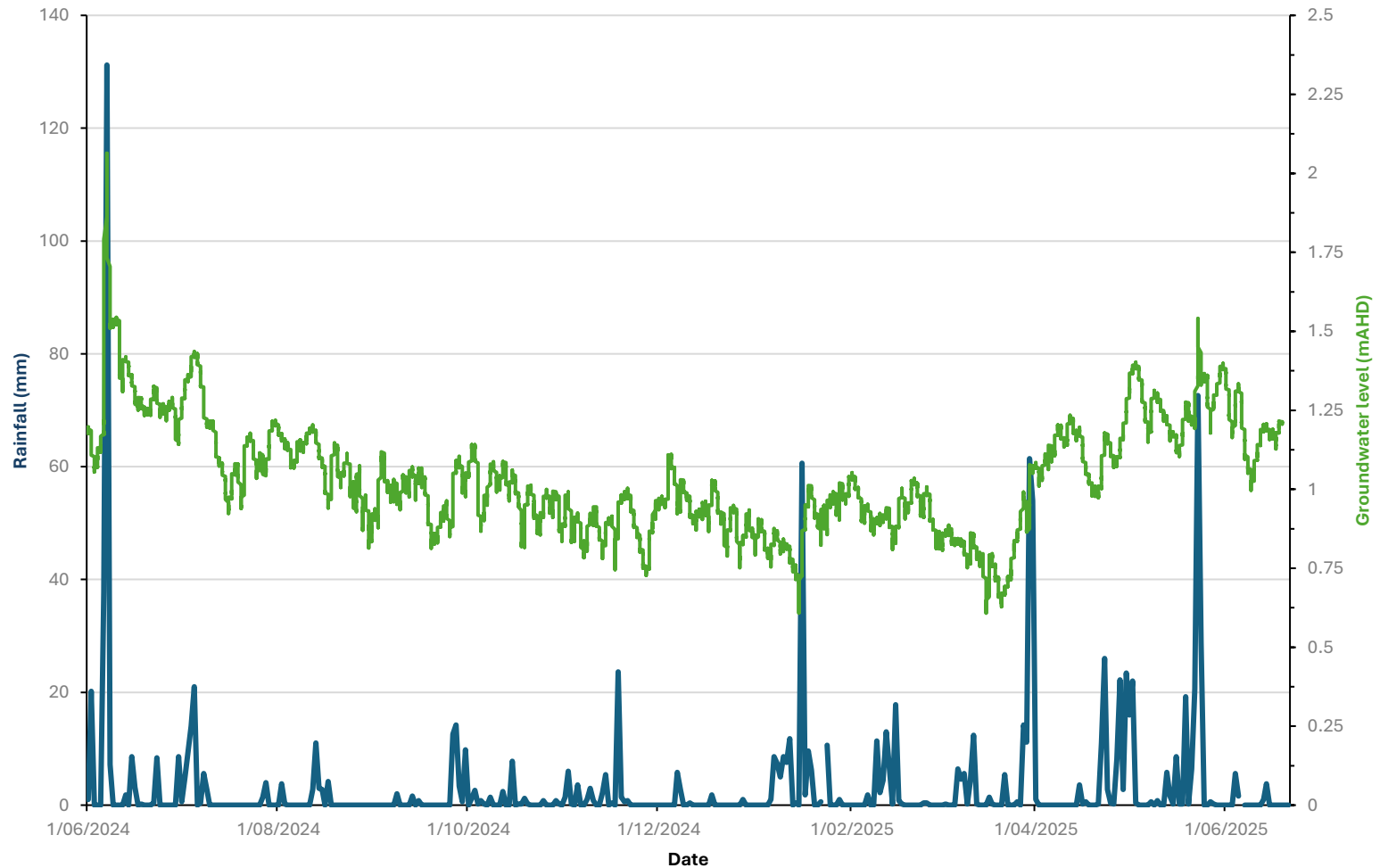
Figure: **A5**

Address: **38 Tabbita Road, Dunmore, NSW**

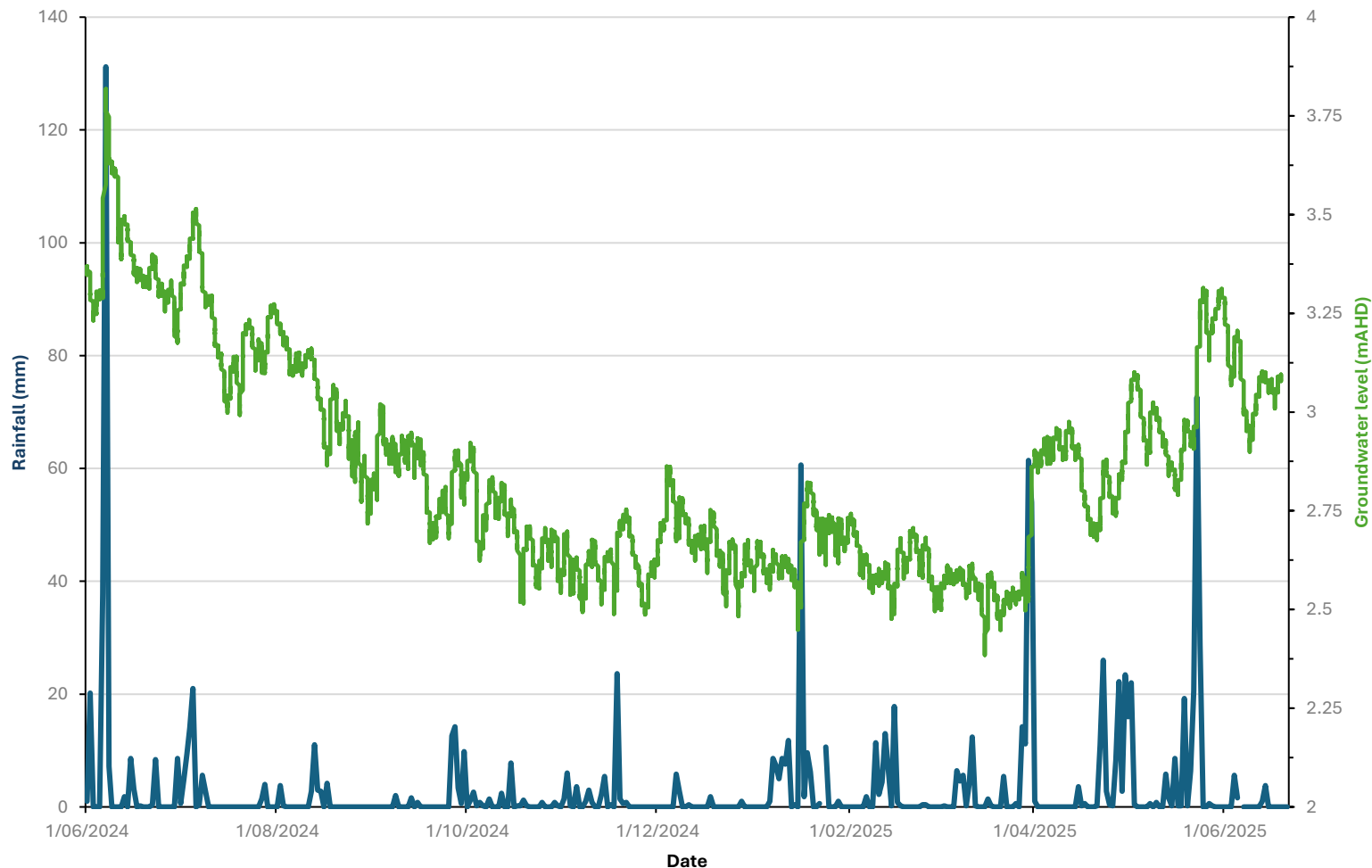
DG31 - Annual Groundwater Levels vs Rainfall - Jun-24 to Jun-25



DG36 - Annual Groundwater Levels vs Rainfall - Jun-24 to Jun-25



MW5A1 - Annual Groundwater Levels vs Rainfall - Jun-24 to Jun-25



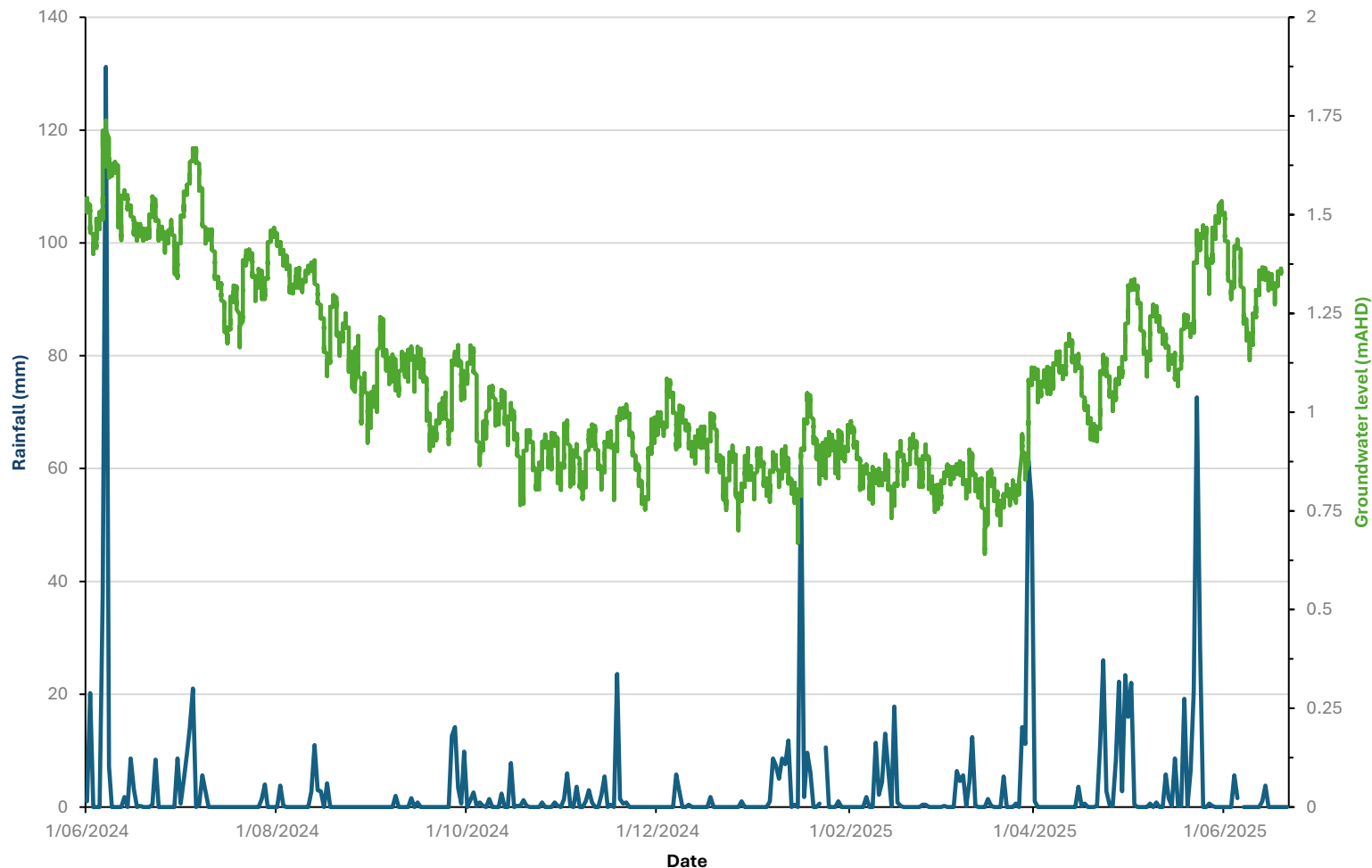
Project: **40.04**

Figure: **A8**

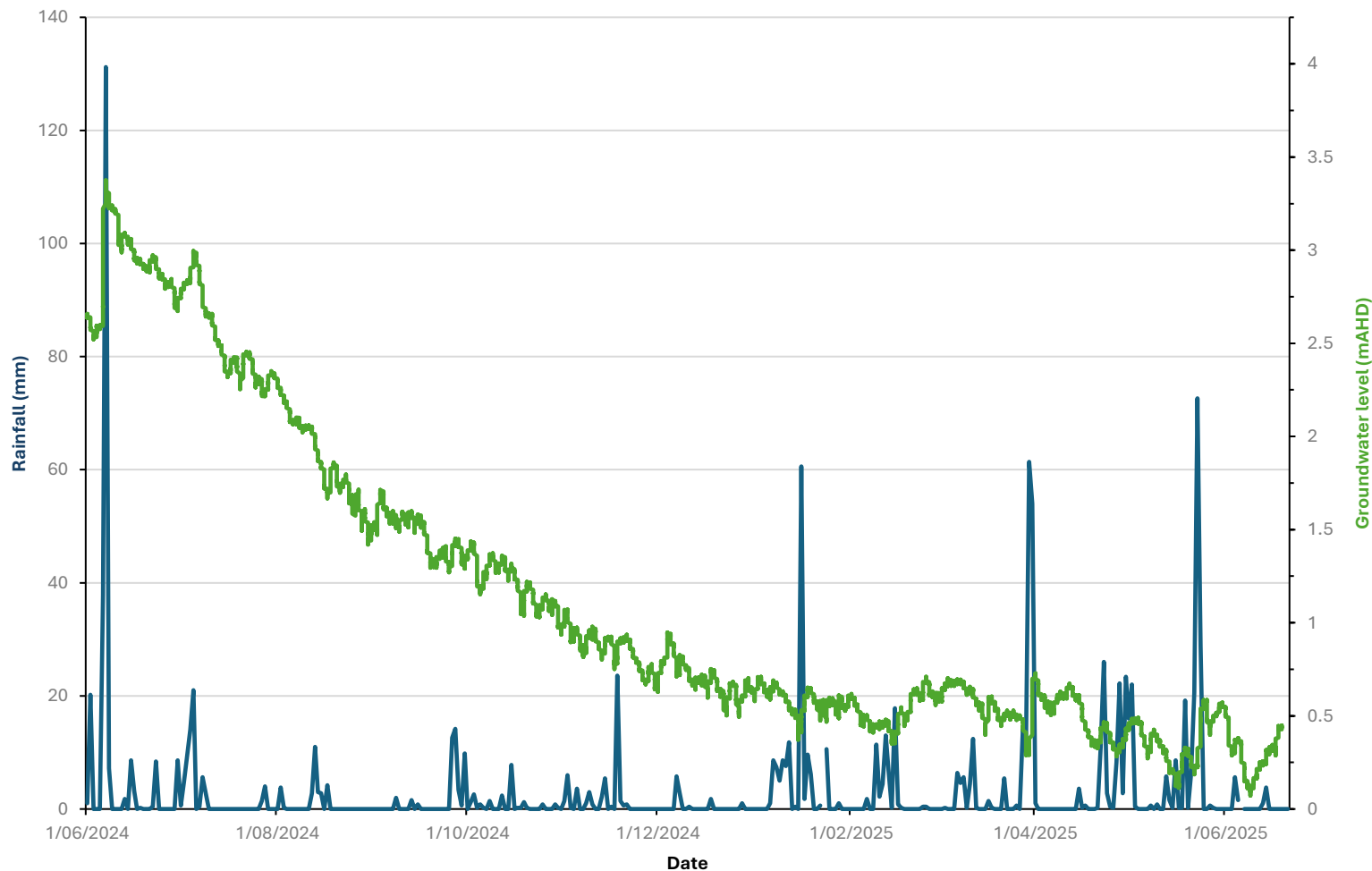
Title: **MW5A1 – Annual Groundwater Levels vs Rainfall – June 2024 to June 2025**

Address: **38 Tabbita Road, Dunmore, NSW**

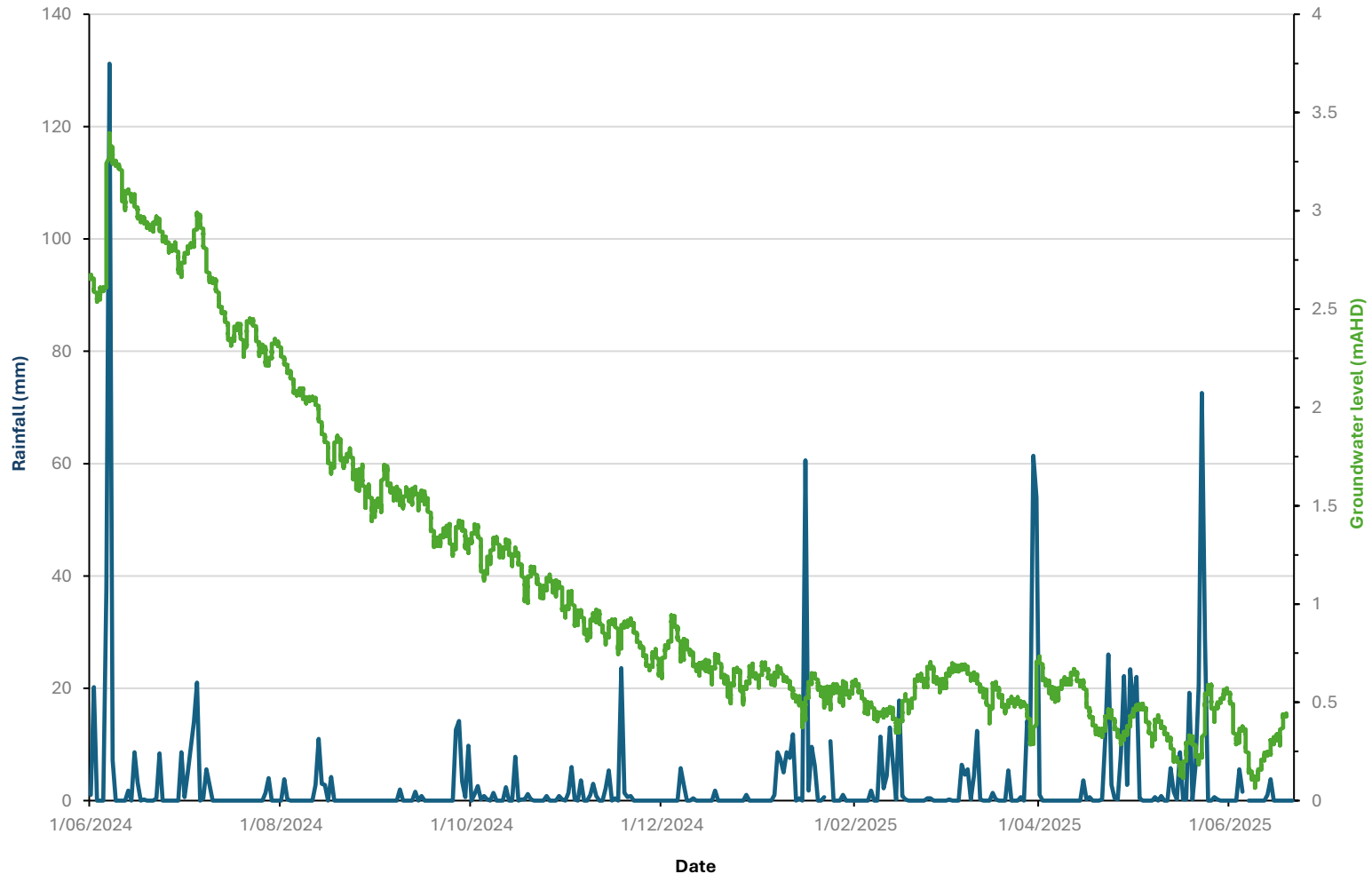
MW5A3 - Annual Groundwater Levels vs Rainfall - Jun-24 to Jun-25



MW5B2d - Annual Groundwater Levels vs Rainfall - Jun-24 to Jun-25



MW5B2s - Annual Groundwater Levels vs Rainfall - Jun-24 to Jun-25



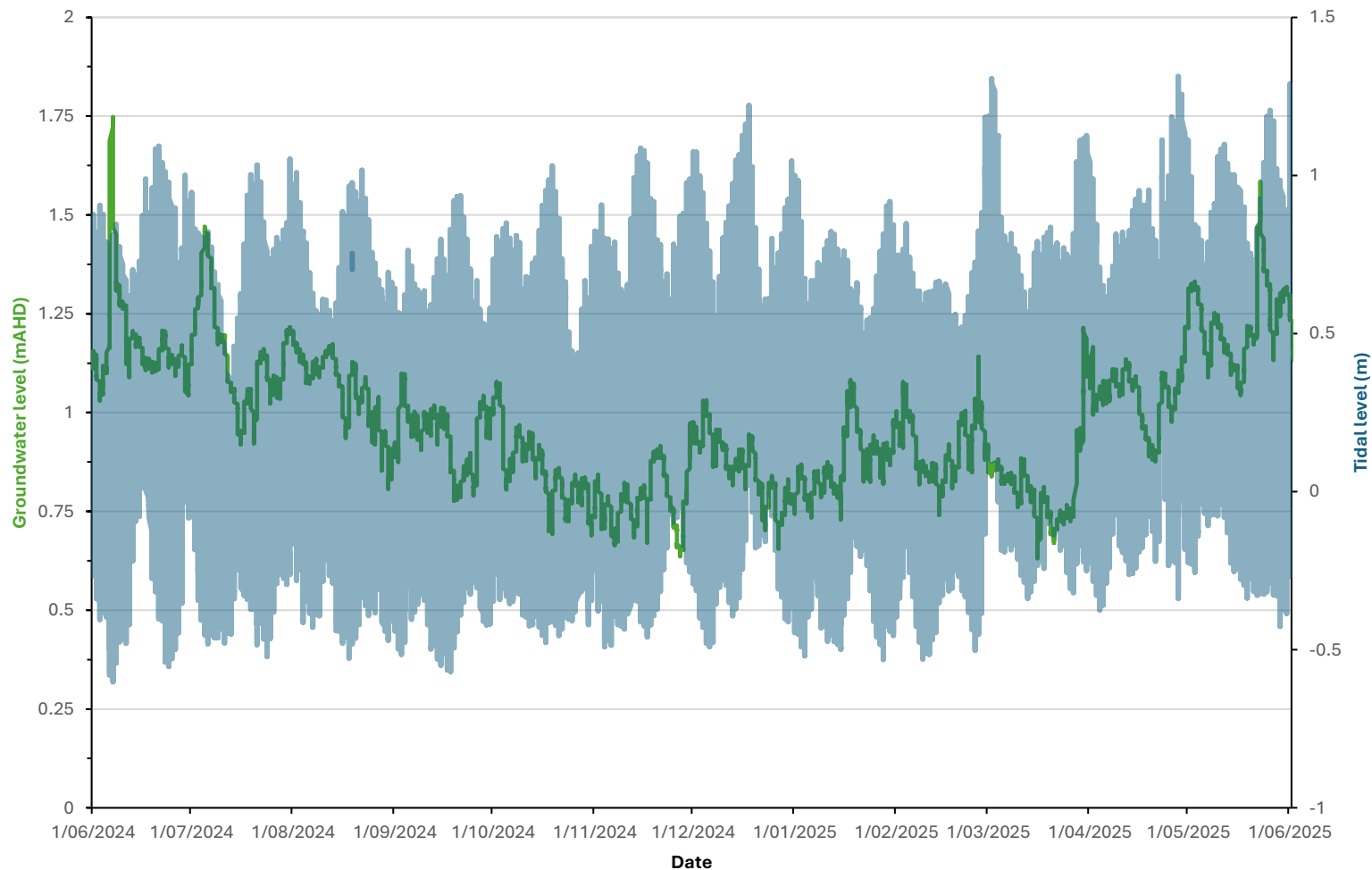
Project: **40.04**

Figure: **A11**

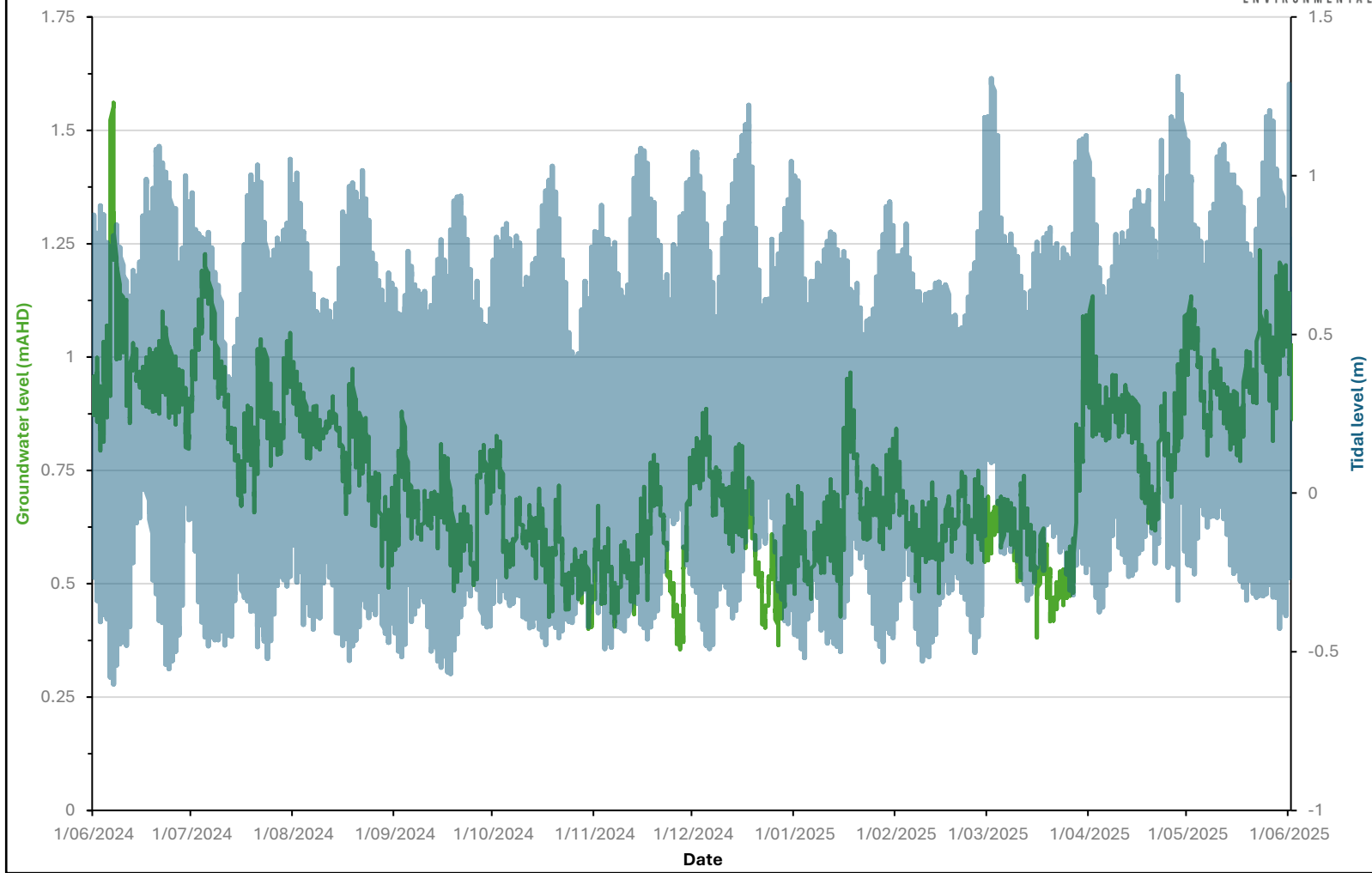
Title: **MW5B2s – Annual Groundwater Levels vs Rainfall – June 2024 to June 2025**

Address: **38 Tabbita Road, Dunmore, NSW**

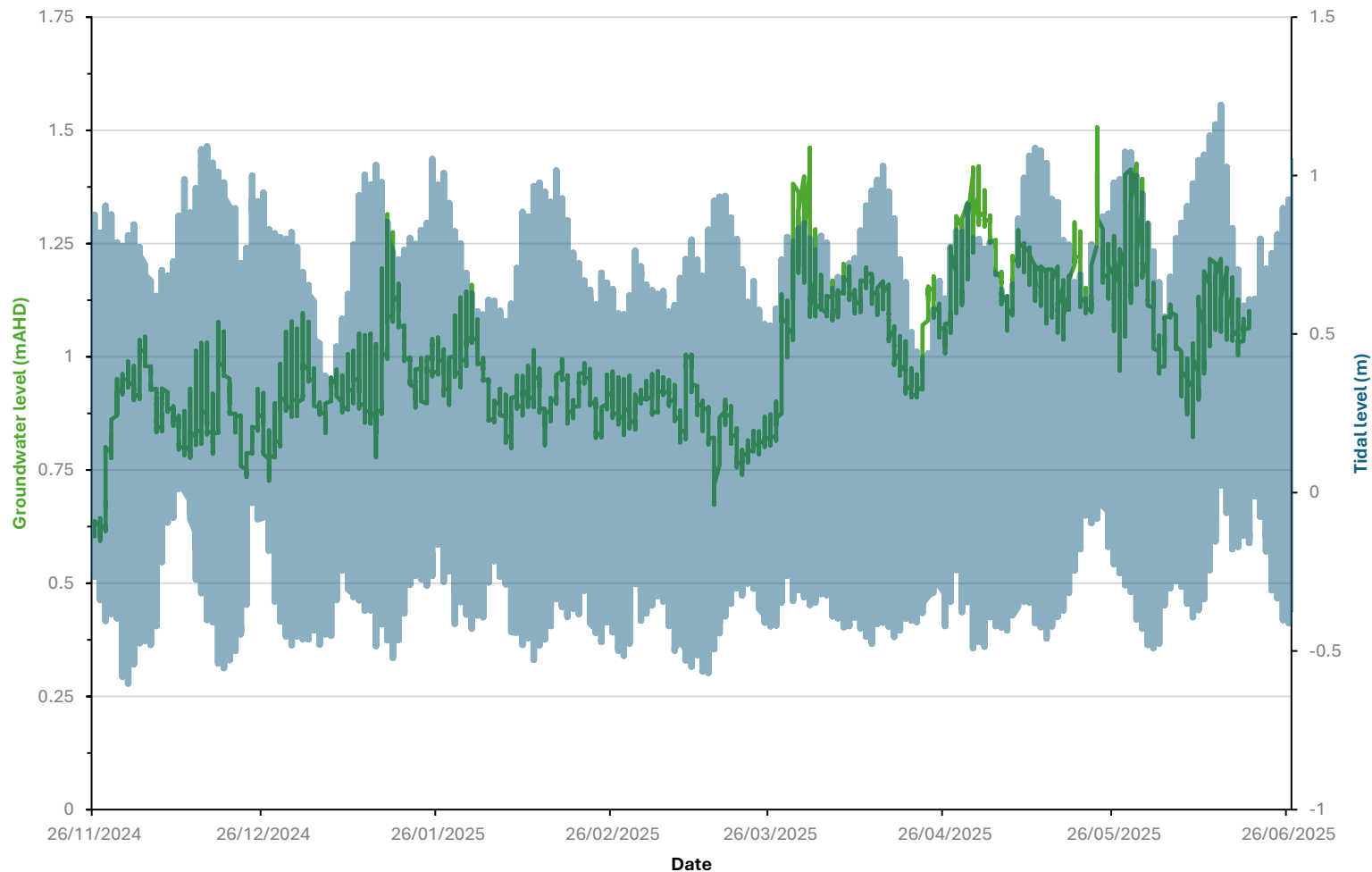
DG1s - Annual Groundwater levels vs Tidal Levels - Jun 24 to Jun 25



DG5d - Annual Groundwater levels vs Tidal Levels - Jun-24 to Jun-25



DG6s - Annual Groundwater levels vs Tidal Level - Nov-24 to Jun-25



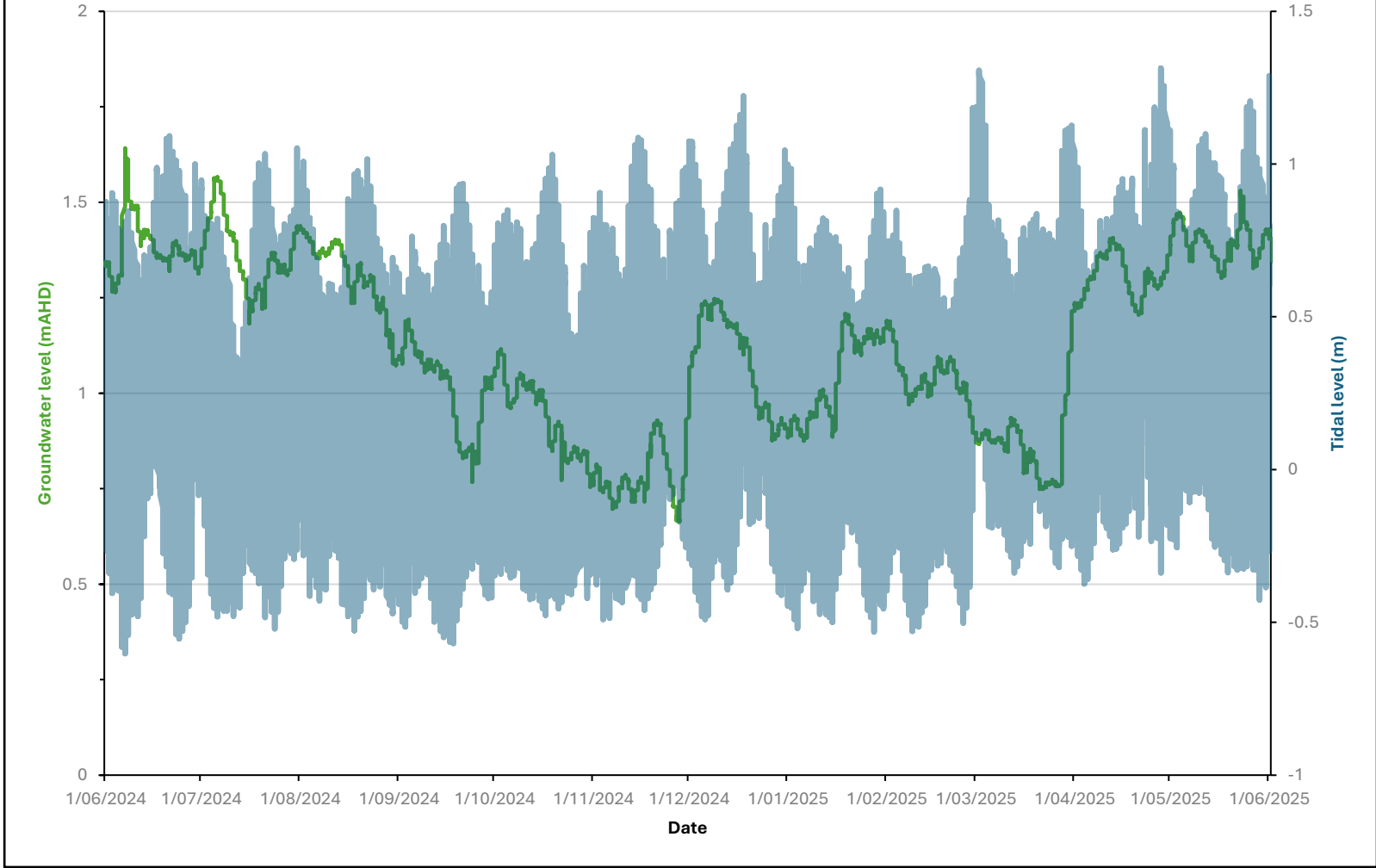
Project: **40.04**

Figure: **A14**

Title: **DG6s – Annual Groundwater Levels vs Tidal Levels – November 2024 to June 2025**

Address: **38 Tabbita Road, Dunmore, NSW**

DG17 - Annual Groundwater levels vs Tidal Levels - Jun-24 to Jun-25



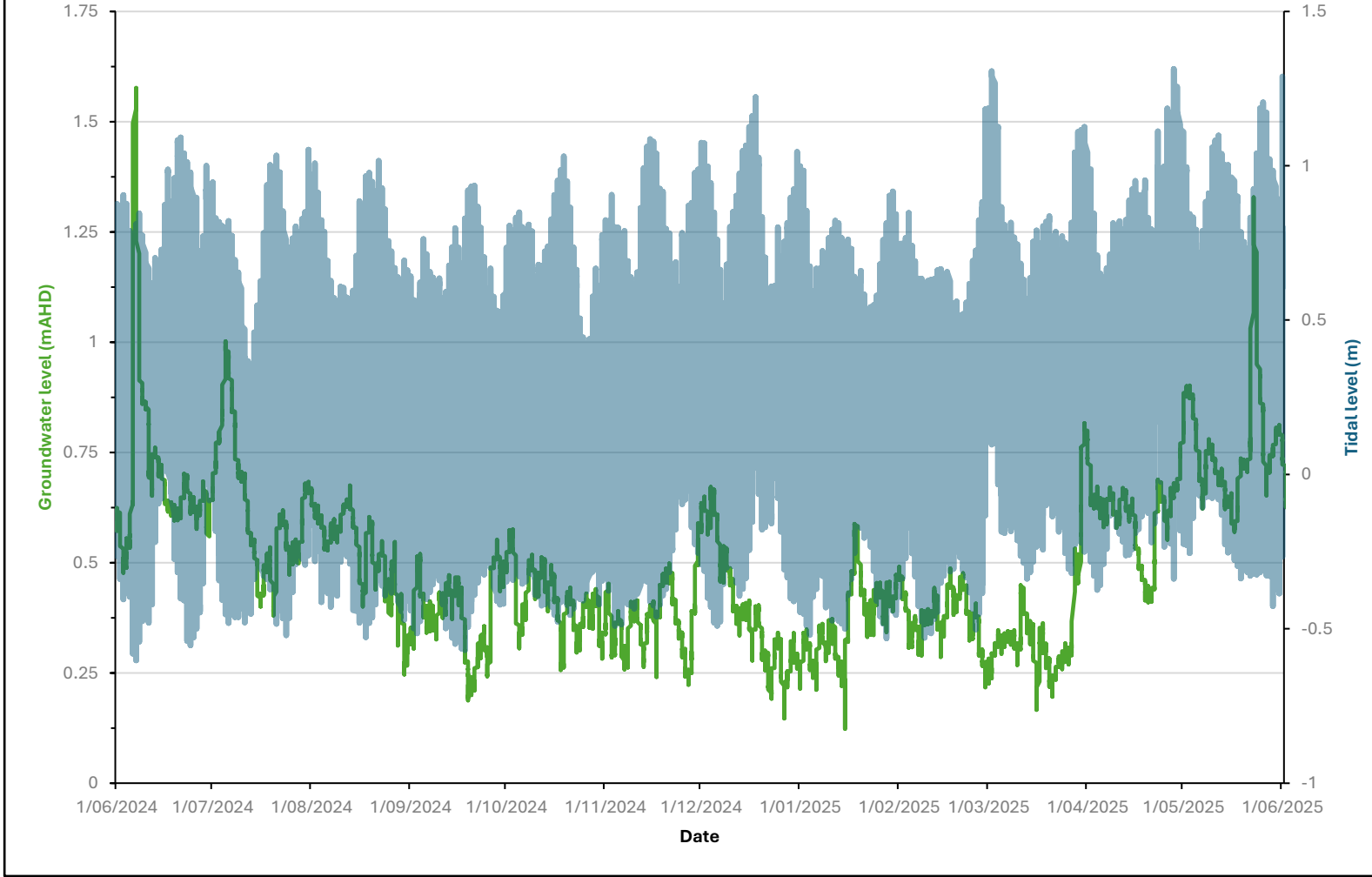
Project: **40.04**

Figure: **A15**

Title: **DG17 – Annual Groundwater Levels vs Tidal Levels – June 2024 to June 2025**

Address: **38 Tabbita Road, Dunmore, NSW**

DG21 - Annual Groundwater levels vs Tidal Levels - Jun-24 to Jun-25



Project: **40.04**

Title: **DG21 – Annual Groundwater Levels vs Tidal Levels – June 2024 to June 2025**

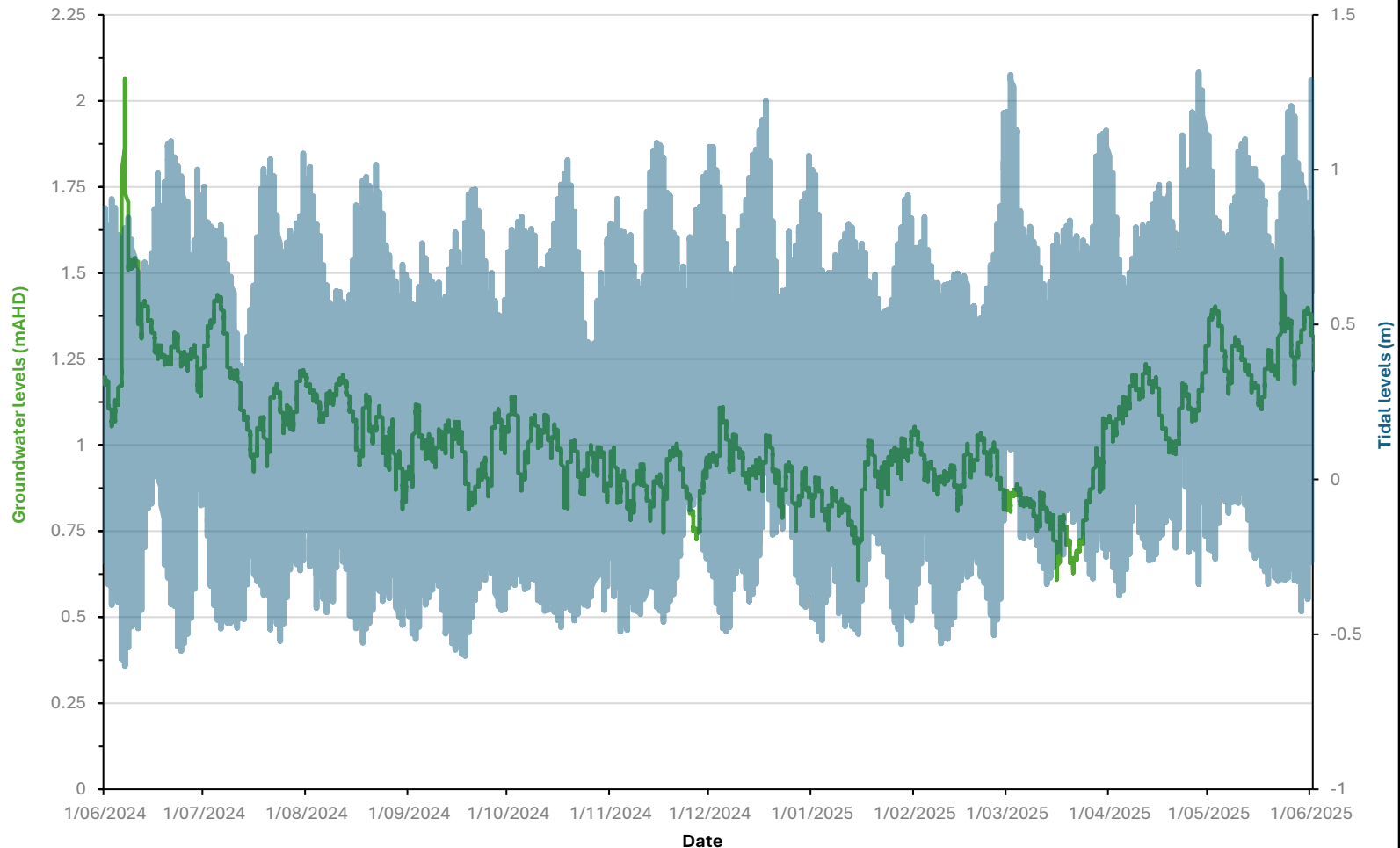
Figure: **A16**

Address: **38 Tabbita Road, Dunmore, NSW**

DG31 - Annual Groundwater levels vs Tidal Levels - Jun-24 to Jun-25



DG36 - Annual Groundwater levels vs Tidal Levels - Jun-24 to Jun-25



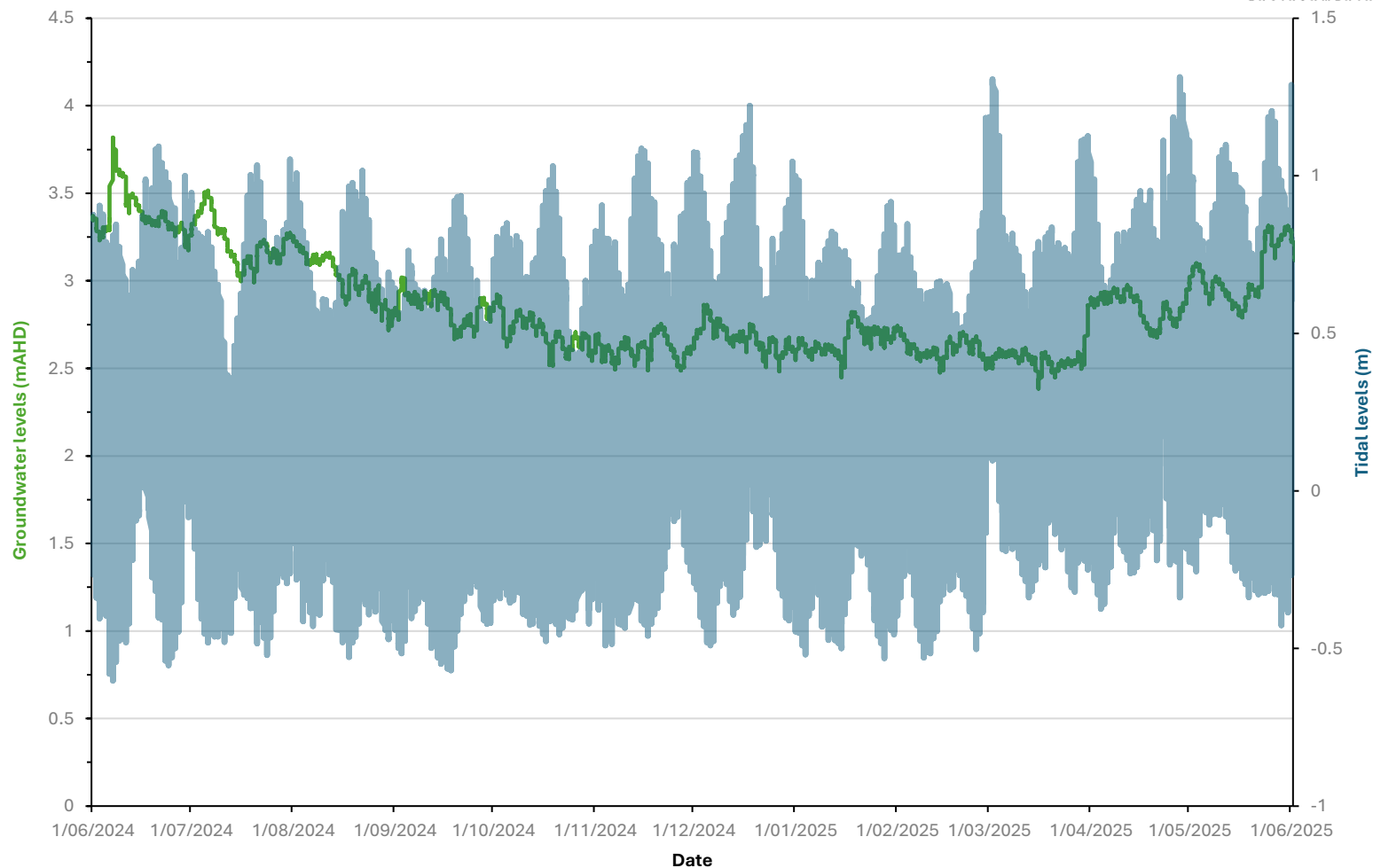
Project: **40.04**

Figure: **A18**

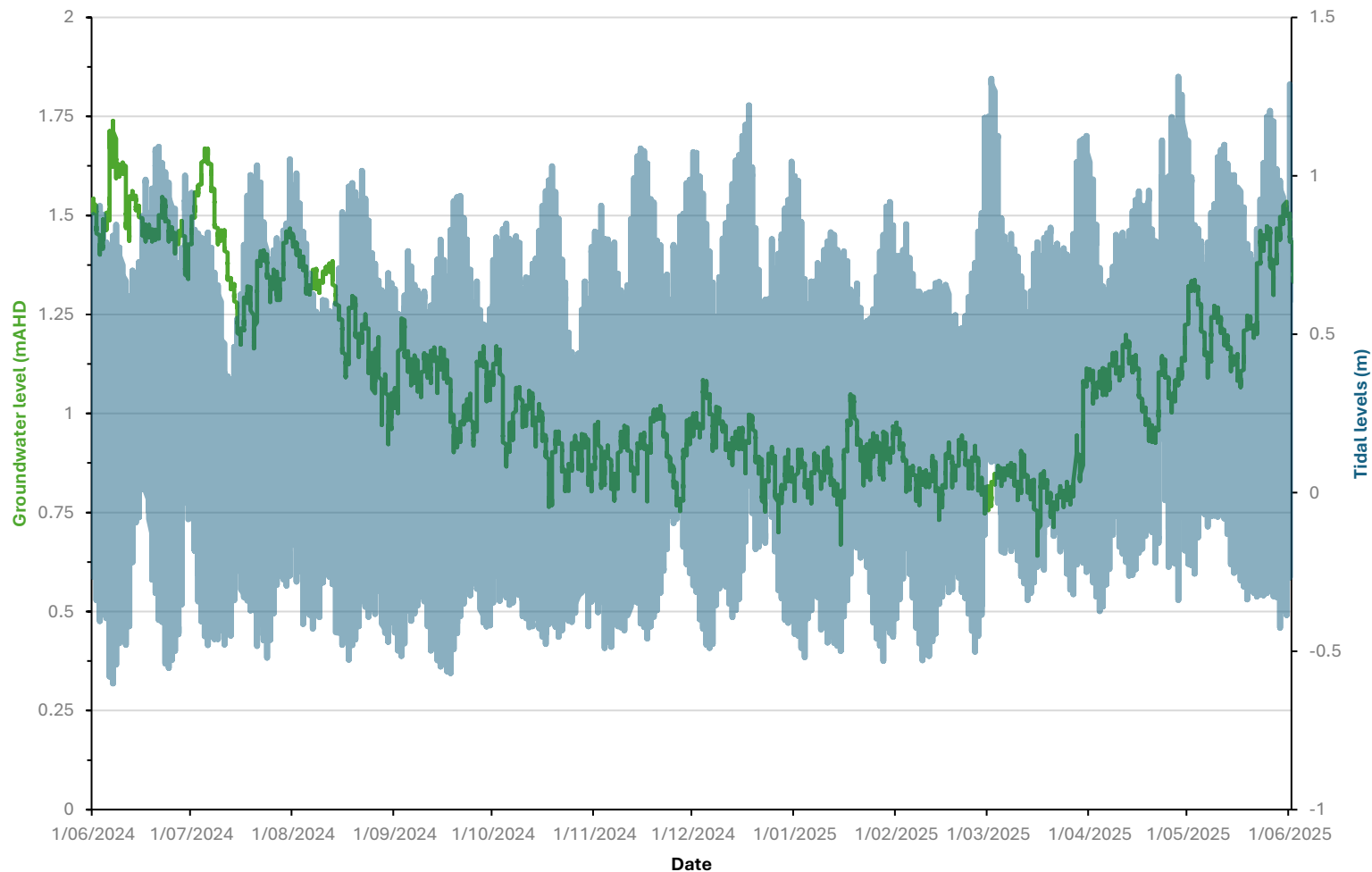
Title: **DG36 – Annual Groundwater Levels vs Tidal Levels – June 2024 to June 2025**

Address: **38 Tabbita Road, Dunmore, NSW**

MW5A1 - Annual Groundwater levels vs Tidal Levels - Jun-24 to Jun-25



MW5A3 - Annual Groundwater levels vs Tidal levels - Jun-24 to Jun-25



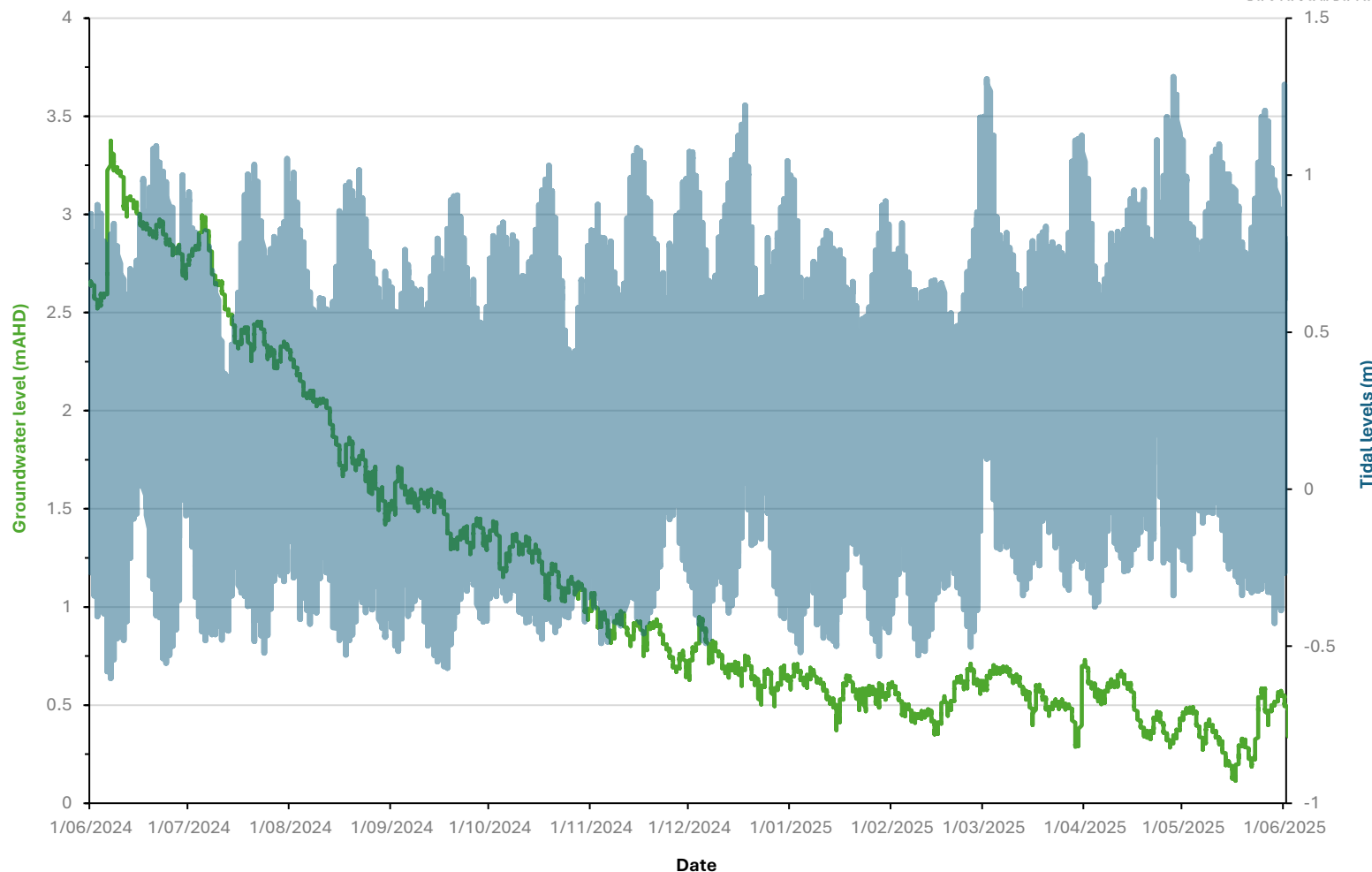
Project: **40.04**

Figure: **A20**

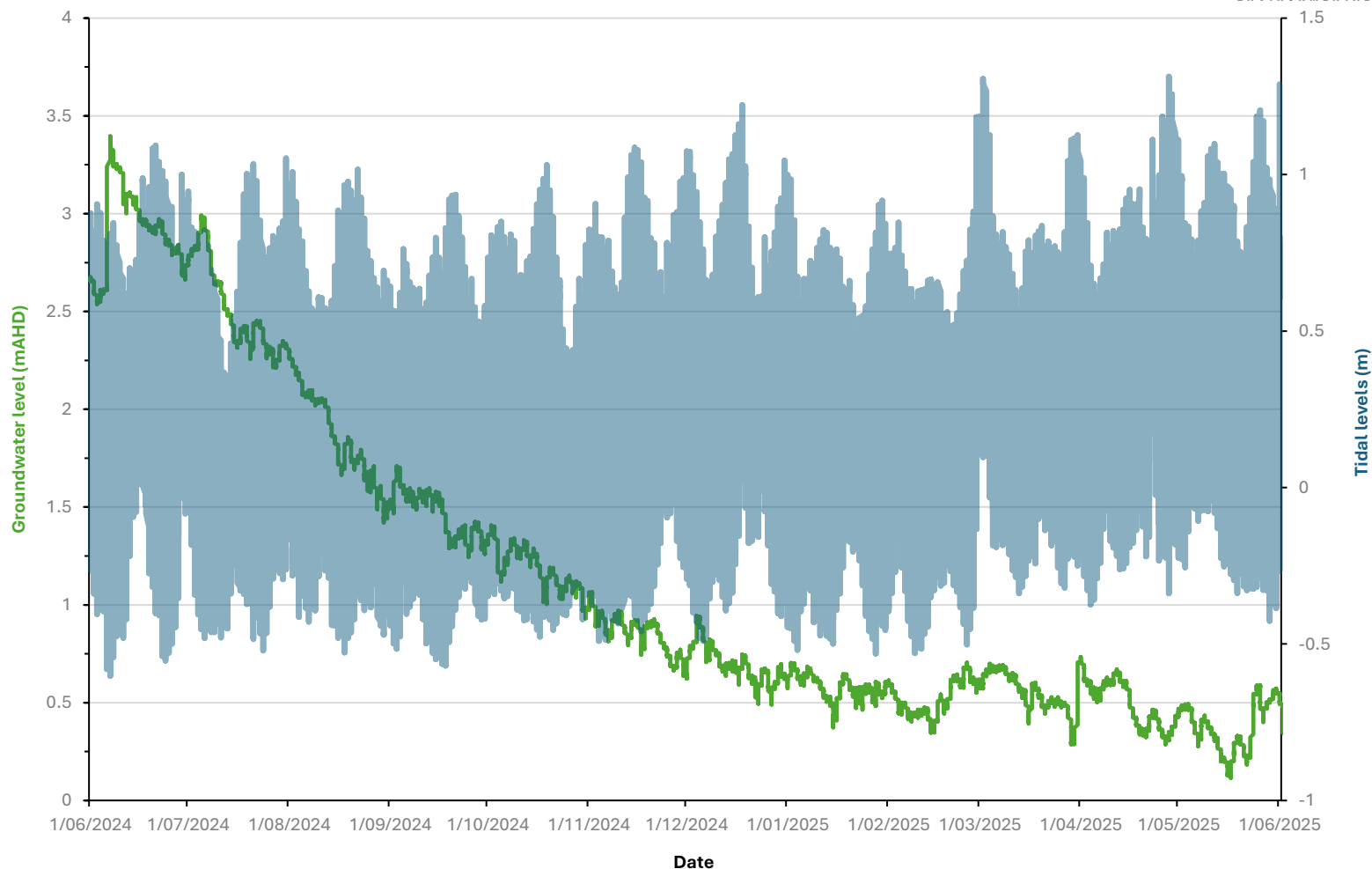
Title: **MW5A3 – Annual Groundwater Levels vs Tidal Levels – June 2024 to June 2025**

Address: **38 Tabbita Road, Dunmore, NSW**

MW5B2d - Annual Groundwater levels vs Tidal levels - Jun-24 to Jun-25



MW5B2s - Annual Groundwater levels vs Tidal levels - Jun-24 to Jun-25



Project: **40.04**

Title: **MW5B2s – Annual Groundwater Levels vs Tidal Levels – June 2024 to June 2025**

Figure: **A22**

Address: **38 Tabbita Road, Dunmore, NSW**

Appendix B

Groundwater Analytical Data

Table B1: Summary of Stage 2-4 (West) Groundwater Analytical Results
Dunmore Sand Soil, 38 Tabbita Road, Dunmore, NSW

Sample ID					DG1s				DG17				DG21				DG31s			
Month					Aug-24	Nov-24	Feb-25	May-25	Aug-24	Nov-24	Feb-25	May-25	Aug-24	Nov-24	Feb-25	May-25	Aug-24	Nov-24	Feb-25	May-25
Sample Date					29/08/2025	19/11/2025	18/02/2025	20/05/2025	29/08/2025	19/11/2025	18/02/2025	20/05/2025	29/08/2025	19/11/2025	18/02/2025	20/05/2025	29/08/2025	19/11/2025	18/02/2025	20/05/2025
Analyte	Units	Development Consent Trigger Values ¹	GMMP Trigger Values ²	LOR																
pH	-	6.5 - 8.5	6.5 - 8.5	-	7.65 ^A	7.26	7.34	7.44	7.02 ^A	8.38	7.46	6.93	6.71 ^A	6.67	6.57	7.09	7.02 ^A	6.72	6.68	7.1
Electrical Conductivity (EC)	µS/cm	>1500	33,000	-	505 ^A	514	544	564	277 ^A	244	2190	2050	932 ^A	895	946	898	487 ^A	985	774	621
Total Dissolved Solids (TDS)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen (DO)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oxydation-Reduction Potential (Redox)	mV	-	-	-	51 ^A	129	23	49	18 ^A	77	45	299	54 ^A	56	-31	109	-1 ^A	5	-44	47
Hydroxide Alkalinity as CaCO ₃	mg/L	-	-	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO ₃	mg/L	-	-	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO ₃	mg/L	750	400	1	208	197	240	232	936	796	802	621	273	217	133	126	127	170	169	141
Total Alkalinity as CaCO ₃	mg/L	-	-	1	208	197	240	232	936	796	802	621	273	217	133	126	127	170	169	141
Sulfate as SO ₄	mg/L	250	300	1	<10	<1	<1	<1	<10	<1	<1	69	43	42	89	80	111	312	200	163
Chloride (Cl)	mg/L	300	6,900	1	42	47	49	44	449	470	381	303	143	170	206	184	21	51	34	26
Calcium (Ca)	mg/L	-	-	1	65	60	70	80	100	85	88	112	52	33	21	21	72	131	99	93
Magnesium (Mg)	mg/L	50	420	1	9	10	11	11	117	101	94	81	19	21	14	15	10	34	19	17
Sodium (Na)	mg/L	400	5,500	1	43	43	40	42	390	334	303	257	156	150	171	162	31	61	44	32
Potassium (K)	mg/L	50	170	1	2	2	2	2	36	34	32	28	1	2	2	2	2	4	3	3
Iron (Fe)	mg/L	6	4	0.05	2.14	2.27	2.59	3.43	1.98	2.89	1.03	1.23	1.00	0.87	0.85	1.00	1.30	1.48	1.11	1.07
Fluoride (F)	mg/L	-	-	0.1	0.3	0.2	-	-	0.8	0.7	-	-	0.2	0.2	-	-	0.1	0.1	-	-
Ammonium as N	mg/L	-	-	0.01	0.73	0.89	-	0.82	0.96	1.10	-	0.84	0.36	0.49	-	0.55	0.06	0.35	-	0.19
Ammonia as N	mg/L	20	1	0.01	0.74	0.90	0.92	0.83	0.96	1.19	0.92	0.84	0.36	0.49	0.53	0.55	0.06	0.35	0.31	0.19
Nitrite as N	mg/L	-	-	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nitrate as N	mg/L	-	-	0.01	<0.01	0.01	<0.01	<0.01	0.03	0.02	<0.01	<0.01	<0.01	<0.01	0.01	0.03	1.02	<0.01	0.01	0.01
Nitrite + Nitrate as N	mg/L	-	-	0.01	<0.01	0.01	<0.01	<0.01	0.03	0.02	<0.01	0.01	<0.01	<0.01	0.01	0.03	1.02	<0.01	0.01	0.01
Total Kjeldahl Nitrogen as N	mg/L	-	-	0.1	1.4	1.3	1.6	1.4	1.8	1.7	1.6	1.5	1.5	1.3	1.0	1.0	0.5	0.7	0.8	0.6
Total Nitrogen as N	mg/L	0.1 - 0.5	-	0.1	1.4	1.3	1.6	1.4	1.8	1.7	1.6	1.5	1.5	1.3	1.0	1.0	1.5	0.7	0.8	0.6
Total Phosphorus as P	mg/L	0.005 - 0.5	4	0.01	0.20	0.23	0.22	0.20	2.84	2.91	2.35	2.32	0.33	0.37	0.32	0.32	0.04	0.06	0.07	0.003
Total Anions	meq/L	-	-	0.01	5.34	5.26	6.18	-	31.4	29.2	26.8	-	10.4	10.0	10.3	-	5.44	11.3	8.50	-
Total Cations	meq/L	-	-	0.01	5.51	5.03	6.19	-	31.0	26.7	26.1	-	10.3	8.71	9.69	-	5.32	10.6	8.49	-
Ionic Balance	%	-	-	0.01	1.59	2.29	0.10	-	0.61	4.46	1.22	-	0.45	6.89	3.16	-	1.10	3.17	0.03	-
Thermotolerant Coliforms	CFU/100mL	<1,000	-	1	<1	~3	~7	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Escherichia coli	CFU/100mL	<230	-	1	<1	~3	~3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Enterococci	CFU/100mL	-	-	1	<1	<1	180	<1	<1	<1	~2	36	<1	~1	<1	<1	<1	<1	<1	<1

A. Water quality parameters recorded on 23 August 2024.

1. Generic trigger values provided in Development Consent 195-8-2004

2. Stages 2-4 specific trigger values provided in EES (2018) GMMP

Table B1: Summary of Stage 2-4 (West) Groundwater Analytical Results
Dunmore Sand Soil, 38 Tabbita Road, Dunmore, NSW

Sample ID					DG35				DG36				GW4			
Month					Aug-24	Nov-24	Feb-25	May-25	Aug-24	Nov-24	Feb-25	May-25	Aug-24	Nov-24	Feb-25	May-25
Sample Date					29/08/2025	19/11/2025	18/02/2025	20/05/2025	29/08/2025	19/11/2025	18/02/2025	20/05/2025	29/08/2025	19/11/2025	18/02/2025	20/05/2025
Analyte	Units	Development Consent Trigger Values ¹	GMMP Trigger Values ²	LOR												
pH	-	6.5 - 8.5	6.5 - 8.5	-	6.93 ^A	7.66	6.86	6.9	7.34 ^A	6.76	6.84	7.29	7.44 ^A	7.44	7.33	7.35
Electrical Conductivity (EC)	µS/cm	>1500	33,000	-	1020 ^A	971	961	996	902 ^A	992	1070	1020	911 ^A	883	893	777
Total Dissolved Solids (TDS)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen (DO)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oxydation-Reduction Potential (Redox)	mV	-	-	-	-93 ^A	55	-86	-11	107 ^A	-83	-36	136	189 ^A	148	3	127
Hydroxide Alkalinity as CaCO ₃	mg/L	-	-	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO ₃	mg/L	-	-	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO ₃	mg/L	750	400	1	352	392	339	313	322	314	503	403	214	194	203	182
Total Alkalinity as CaCO ₃	mg/L	-	-	1	352	392	339	313	322	314	503	403	214	194	203	182
Sulfate as SO ₄	mg/L	250	300	1	124	36	102	139	81	116	144	60	14	12	11	11
Chloride (Cl)	mg/L	300	6,900	1	45	66	50	54	56	55	62	69	190	209	195	194
Calcium (Ca)	mg/L	-	-	1	67	81	60	66	67	63	100	99	75	71	71	77
Magnesium (Mg)	mg/L	50	420	1	34	37	32	32	28	32	46	42	19	18	17	18
Sodium (Na)	mg/L	400	5,500	1	116	93	109	108	100	111	80	89	116	112	105	108
Potassium (K)	mg/L	50	170	1	8	15	8	8	13	8	16	16	1	1	<1	<1
Iron (Fe)	mg/L	6	4	0.05	30.6	2.62	29.2	36.3	1.41	27.5	2.64	2.56	0.33	0.20	0.08	0.09
Fluoride (F)	mg/L	-	-	0.1	0.2	0.6	-	-	0.6	0.2	-	-	0.2	0.2	-	-
Ammonium as N	mg/L	-	-	0.01	1.35	0.10	-	0.58	0.11	0.85	-	0.11	0.04	0.02	-	0.05
Ammonia as N	mg/L	20	1	0.01	1.35	0.10	0.84	0.58	0.11	0.85	0.12	0.11	0.04	0.02	0.09	0.05
Nitrite as N	mg/L	-	-	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nitrate as N	mg/L	-	-	0.01	0.04	<0.01	<0.01	<0.01	<0.01	0.28	<0.01	0.02	0.01	0.02	0.01	0.03
Nitrite + Nitrate as N	mg/L	-	-	0.01	0.04	<0.01	<0.01	<0.01	<0.01	0.28	<0.01	0.02	0.01	0.02	0.01	0.03
Total Kjeldahl Nitrogen as N	mg/L	-	-	0.1	1.8	0.2	1.6	1.2	0.4	1.7	0.4	0.3	0.6	<0.1	0.2	0.2
Total Nitrogen as N	mg/L	0.1 - 0.5	-	0.1	1.8	0.2	1.6	1.2	0.4	2.0	0.4	0.3	0.6	<0.1	0.2	0.2
Total Phosphorus as P	mg/L	0.005 - 0.5	4	0.01	1.10	0.26	1.00	1.02	0.19	1.04	0.24	0.21	0.07	0.05	0.14	0.03
Total Anions	meq/L	-	-	0.01	10.9	10.4	10.3	-	9.70	10.2	14.8	-	9.93	10.0	9.78	-
Total Cations	meq/L	-	-	0.01	10.7	10.2	10.6	-	9.84	9.40	12.7	-	9.81	9.52	9.51	-
Ionic Balance	%	-	-	0.01	0.83	1.02	1.27	-	0.72	4.28	7.76	-	0.60	0.52	1.43	-
Thermotolerant Coliforms	CFU/100mL	<1,000	-	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	~9	<1	~25
Escherichia coli	CFU/100mL	<230	-	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	~9	<1	~<1
Enterococci	CFU/100mL	-	-	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	19	21

A. Water quality parameters recorded on 23 August 2024.

1. Generic trigger values provided in Development Consent 195-8-2004

2. Stages 2-4 specific trigger values provided in EES (2018) GMMP

Table B2: Summary of Stage 2-4 (East) Groundwater Analytical Results
Dunmore Sand Soil, 38 Tabbita Road, Dunmore, NSW

Sample ID					DG5s				DG5d				DG6s			
Month					Aug-24	Nov-24	Feb-25	May-25	Aug-24	Nov-24	Feb-25	May-25	Aug-24	Nov-24	Feb-25	May-25
Sample Date					29/08/2025	19/11/2025	18/02/2025	20/05/2025	29/08/2025	19/11/2025	18/02/2025	20/05/2025	29/08/2025	19/11/2025	18/02/2025	20/05/2025
Analyte	Units	Development Consent Trigger Values ¹	GMMP Trigger Values ²	LOR												
pH	-	6.5 - 8.5	6.5 - 8.5	-	7.94 ^A	7.68	7.17	7.53	7.58 ^A	7.06	6.29	6.89	7.21 ^A	6.39	7.13	6.8
Electrical Conductivity (EC)	µS/cm	>1500	33,000	-	1630 ^A	156	913	904	1770 ^A	1550	14400	14800	3090 ^A	1780	18800	18200
Total Dissolved Solids (TDS)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen (DO)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oxydation-Reduction Potential (Redox)	mV	-	-	-	-3 ^A	-67	-36	102	-19 ^A	-35	-78	64	-72 ^A	76	-124	75
Hydroxide Alkalinity as CaCO ₃	mg/L	-	-	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO ₃	mg/L	-	-	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO ₃	mg/L	750	400	1	278	352	276	232	336	250	333	296	382	347	394	342
Total Alkalinity as CaCO ₃	mg/L	-	-	1	278	352	276	232	336	250	333	296	382	347	394	342
Sulfate as SO ₄	mg/L	250	300	1	146	780	128	132	751	141	534	579	874	715	671	702
Chloride (Cl)	mg/L	300	6,900	1	100	7000	98	95	5430	101	4970	4850	5600	6180	5830	5590
Calcium (Ca)	mg/L	-	-	1	136	352	133	136	262	135	216	234	192	187	180	199
Magnesium (Mg)	mg/L	50	420	1	20	500	19	19	405	22	299	334	445	426	404	420
Sodium (Na)	mg/L	400	5,500	1	63	3880	61	64	3440	63	2560	2800	3540	3420	3280	3360
Potassium (K)	mg/L	50	170	1	4	117	4	4	104	4	80	90	130	129	121	123
Iron (Fe)	mg/L	6	4	0.05	2.68	3.72	2.98	3.05	3.06	3.20	2.49	2.26	6.42	5.36	4.51	4.92
Fluoride (F)	mg/L	-	-	0.1	0.3	0.6	-	-	0.6	0.3	-	-	0.6	0.6	-	-
Ammonium as N	mg/L	-	-	0.01	0.36	2.88	-	0.39	1.69	0.42	-	1.25	0.53	0.52	-	0.69
Ammonia as N	mg/L	20	1	0.01	0.37	2.93	0.40	0.39	1.71	0.42	1.39	1.27	0.53	0.52	0.63	0.69
Nitrite as N	mg/L	-	-	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nitrate as N	mg/L	-	-	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01
Nitrite + Nitrate as N	mg/L	-	-	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01
Total Kjeldahl Nitrogen as N	mg/L	-	-	0.1	0.9	4.7	0.8	0.8	2.2	0.8	2.0	1.7	1.5	1.5	1.7	1.7
Total Nitrogen as N	mg/L	0.1 - 0.5	-	0.1	0.9	4.7	0.8	0.8	2.2	0.8	2.0	1.7	1.5	1.5	1.7	1.7
Total Phosphorus as P	mg/L	0.005 - 0.5	4	0.01	0.16	0.60	0.17	0.17	0.54	0.21	0.55	0.50	0.25	0.25	0.28	0.21
Total Anions	meq/L	-	-	0.01	11.4	221	10.9	-	176	10.8	158	-	184	196	186	-
Total Cations	meq/L	-	-	0.01	10.5	216	11.0	-	191	9.58	149	-	192	181	188	-
Ionic Balance	%	-	-	0.01	4.17	1.20	0.06	-	4.16	5.90	2.99	-	2.08	3.95	0.45	-
Thermotolerant Coliforms	CFU/100mL	<1,000	-	1	<1	<1	<1	<1	<1	~7	<1	<1	<1	~2	<1	<1
Escherichia coli	CFU/100mL	<230	-	1	<1	<1	<1	<1	<1	~7	<1	<1	<1	~2	<1	<1
Enterococci	CFU/100mL	-	-	1	<1	<1	11	<1	<1	~5	<1	<1	<1	<1	~3	<1

A. Water quality parameters recorded on 23 August 2024.

1. Generic trigger values provided in Development Consent 195-8-2004

2. Stages 2-4 specific trigger values provided in EES (2018) GMMP

Table B2: Summary of Stage 2-4 (East) Groundwater Analytical Results
Dunmore Sand Soil, 38 Tabbita Road, Dunmore, NSW

Sample ID					DG6d				DG7			
Month					Aug-24	Nov-24	Feb-25	May-25	Aug-24	Nov-24	Feb-25	May-25
Sample Date					29/08/2025	19/11/2025	18/02/2025	20/05/2025	29/08/2025	19/11/2025	18/02/2025	20/05/2025
Analyte	Units	Development Consent Trigger Values ¹	GMMP Trigger Values ²	LOR								
pH	-	6.5 - 8.5	6.5 - 8.5	-	6.99 ^A	6.49	6.77	6.75	7.37 ^A	6.97	6.84	7.18
Electrical Conductivity (EC)	µS/cm	>1500	33,000	-	1910 ^A	2930	29300	28200	684 ^A	654	700	671
Total Dissolved Solids (TDS)	mg/L	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen (DO)	mg/L	-	-	-	-	-	-	-	-	-	-	-
Oxydation-Reduction Potential (Redox)	mV	-	-	-	-13 ^A	16	-94	62	136 ^A	83	72	120
Hydroxide Alkalinity as CaCO ₃	mg/L	-	-	1	<1	<1	<1	<1	<1	<1	<1	fr
Carbonate Alkalinity as CaCO ₃	mg/L	-	-	1	<1	<1	<1	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO ₃	mg/L	750	400	1	455	397	440	384	306	241	248	237
Total Alkalinity as CaCO ₃	mg/L	-	-	1	455	397	440	384	306	241	248	237
Sulfate as SO ₄	mg/L	250	300	1	1600	1450	1360	1400	39	35	37	35
Chloride (Cl)	mg/L	300	6,900	1	9510	9800	9250	8640	32	47	60	48
Calcium (Ca)	mg/L	-	-	1	411	409	401	432	70	57	60	65
Magnesium (Mg)	mg/L	50	420	1	745	745	704	709	21	17	17	18
Sodium (Na)	mg/L	400	5,500	1	5930	5900	5470	5480	80	72	74	74
Potassium (K)	mg/L	50	170	1	184	194	182	177	2	2	2	2
Iron (Fe)	mg/L	6	4	0.05	19.6	21.2	20.6	17.3	1.16	1.06	0.88	1.75
Fluoride (F)	mg/L	-	-	0.1	0.4	0.3	-	-	0.5	0.5	-	-
Ammonium as N	mg/L	-	-	0.01	0.87	0.86	-	0.96	1.06	0.99	-	1.11
Ammonia as N	mg/L	20	1	0.01	0.87	0.86	0.81	0.96	1.07	0.99	0.80	1.11
Nitrite as N	mg/L	-	-	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nitrate as N	mg/L	-	-	0.01	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01
Nitrite + Nitrate as N	mg/L	-	-	0.01	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01
Total Kjeldahl Nitrogen as N	mg/L	-	-	0.1	1.7	1.6	1.9	2.1	1.9	1.2	1.2	1.4
Total Nitrogen as N	mg/L	0.1 - 0.5	-	0.1	1.7	1.6	1.9	2.1	1.9	1.2	1.2	1.4
Total Phosphorus as P	mg/L	0.005 - 0.5	4	0.01	0.47	0.58	0.60	0.59	0.23	0.22	0.18	0.66
Total Anions	meq/L	-	-	0.01	311	314	298	-	7.83	6.87	7.42	-
Total Cations	meq/L	-	-	0.01	336	310	320	-	8.18	6.77	7.66	-
Ionic Balance	%	-	-	0.01	3.89	0.67	3.64	-	2.22	0.72	1.62	-
Thermotolerant Coliforms	CFU/100mL	<1,000	-	1	<1	<1	<1	<1	<1	<1	<1	<1
Escherichia coli	CFU/100mL	<230	-	1	<1	<1	<1	<1	<1	<1	<1	<1
Enterococci	CFU/100mL	-	-	1	<1	<1	~1	<1	<1	<1	<1	<1

A. Water quality parameters recorded on 23 August 2024.
1. Generic trigger values provided in Development Consent 195-8-2004
2. Stages 2-4 specific trigger values provided in EES (2018) GMMP

Table B3: Summary of Stage 5 Groundwater Analytical Results
Dunmore Sand Soil, 38 Tabbita Road, Dunmore, NSW

Sample ID						MW5A1				MW5A3				MW5B2d			
Month						Aug-24	Nov-24	Feb-25	May-25	Aug-24	Nov-24	Feb-25	May-25	Aug-24	Nov-24	Feb-25	May-25
Sample Date						29/08/2025	19/11/2025	18/02/2025	20/05/2025	29/08/2025	19/11/2025	18/02/2025	20/05/2025	29/08/2025	19/11/2025	18/02/2025	20/05/2025
Analyte	Units	Development Consent Trigger Values ¹	GMMP Trigger Values ²	SWMP Water Quality Objective ³	LOR												
pH	-	6.5 - 8.5	6.5 - 8.5	6.5 - 8.5	-	7.77 ^A	7.85	8.37	7.58	7.39 ^A	7.63	7.71	6.99	7.49 ^A	7.13	7.39	7.24
Electrical Conductivity (EC)	µS/cm	>1500	33,000	>1500	-	913 ^A	900	702	859	313 ^A	291	272	286	734 ^A	721	698	667
Total Dissolved Solids (TDS)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen (DO)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oxydation-Reduction Potential (Redox)	mV	-	-	-	-	-66 ^A	-33	-42	-11	56 ^A	36	-101	42	-58 ^A	-34	-10	83
Hydroxide Alkalinity as CaCO ₃	mg/L	-	-	-	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO ₃	mg/L	-	-	-	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO ₃	mg/L	750	400	750	1	63	246	90	91	63	46	59	58	313	283	301	257
Total Alkalinity as CaCO ₃	mg/L	-	-	-	1	63	246	90	91	63	46	59	58	313	283	301	257
Sulfate as SO ₄	mg/L	250	300	250	1	34	28	24	23	16	10	<1	<10	28	19	14	12
Chloride (Cl)	mg/L	300	6,900	300	1	143	89	60	46	34	69	43	42	48	60	55	62
Calcium (Ca)	mg/L	-	-	-	1	15	78	18	30	8	5	6	8	111	99	94	93
Magnesium (Mg)	mg/L	50	420	50	1	14	20	8	9	2	2	3	3	16	15	14	13
Sodium (Na)	mg/L	400	5,500	400	1	90	58	51	44	48	43	44	46	51	48	47	51
Potassium (K)	mg/L	50	170	50	1	5	6	4	5	2	2	2	3	7	6	6	6
Iron (Fe)	mg/L	6	4	6	0.05	2.19	4.31	1.54	2.26	1.27	1.28	0.48	0.57	3.74	3.84	3.73	3.76
Fluoride (F)	mg/L	-	-	-	0.1	<0.1	0.1	-	-	0.2	0.1	-	-	0.2	0.2	-	-
Ammonium as N	mg/L	-	-	-	0.01	0.48	0.37	-	0.42	0.32	0.30	-	0.38	0.53	0.63	-	0.59
Ammonia as N	mg/L	20	1	20	0.01	0.49	0.38	0.54	0.42	0.32	0.30	0.35	0.38	0.54	0.63	0.63	0.59
Nitrite as N	mg/L	-	-	-	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nitrate as N	mg/L	-	-	-	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	0.01	<0.01	<0.01	0.01
Nitrite + Nitrate as N	mg/L	-	-	-	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	0.01	0.01	<0.01	<0.01	0.01
Total Kjeldahl Nitrogen as N	mg/L	-	-	-	0.1	1.3	1.2	1.3	1.3	1.1	0.9	1.1	1.4	1.1	1.0	1.0	1.1
Total Nitrogen as N	mg/L	0.1 - 0.5	-	0.1 - 0.5	0.1	1.3	1.2	1.3	1.3	1.1	0.9	1.1	1.4	1.1	1.0	1.0	1.1
Total Phosphorus as P	mg/L	0.005 - 0.5	0.004	0.005 - 0.5	0.01	0.09	0.21	0.08	0.06	0.13	0.14	0.12	0.08	0.11	0.13	0.10	0.10
Total Anions	meq/L	-	-	-	0.01	6.00	8.01	3.99	-	2.55	3.07	2.39	-	8.19	7.74	7.86	-
Total Cations	meq/L	-	-	-	0.01	5.58	8.21	3.88	-	2.65	3.11	2.51	-	8.60	7.22	8.04	-
Ionic Balance	%	-	-	-	0.01	3.58	1.24	1.44	-	----	0.57	----	-	2.45	3.51	1.16	-
Thermotolerant Coliforms	CFU/100mL	<1,000	-	<1,000	1	<1	~2	<1	<1	<1	~2	<1	~1	<1	<1	<1	<1
Escherichia coli	CFU/100mL	<230	-	<230	1	<1	~1	<1	<1	<1	~1	<1	<1	<1	<1	<1	<1
Enterococci	CFU/100mL	-	-	-	1	<1	~1	<1	<1	<1	~1	<1	<1	<1	<1	<1	<1

A. Water quality parameters recorded on 23 August 2024.

1. Generic trigger values provided in Development Consent 195-8-2004

2. Stages 2-4 specific trigger values provided in EES (2018) GMMP

3. Stage 5 specific trigger values provided in EMM (2021) SWMP

Table B3: Summary of Stage 5 Groundwater Analytical Results
Dunmore Sand Soil, 38 Tabbita Road, Dunmore, NSW

Sample ID						MW5B2s				MW5B3				MW5B4			
Month						Aug-24	Nov-24	Feb-25	May-25	Aug-24	Nov-24	Feb-25	May-25	Aug-24	Nov-24	Feb-25	May-25
Sample Date						29/08/2025	19/11/2025	18/02/2025	20/05/2025	29/08/2025	19/11/2025	18/02/2025	20/05/2025	29/08/2025	19/11/2025	18/02/2025	20/05/2025
Analyte	Units	Development Consent Trigger Values ¹	GMMP Trigger Values ²	SWMP Water Quality Objective ³	LOR												
pH	-	6.5 - 8.5	6.5 - 8.5	6.5 - 8.5	-	7.37 ^A	7.07	7.3	7.08	7.64 ^A	7.43	7.57	7.55	7.68 ^A	7.55	7.79	7.55
Electrical Conductivity (EC)	µS/cm	>1500	33,000	>1500	-	672 ^A	743	769	817	412 ^A	524	506	475	424 ^A	417	390	502
Total Dissolved Solids (TDS)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen (DO)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oxydation-Reduction Potential (Redox)	mV	-	-	-	-	-66 ^A	32	-147	-3	46 ^A	8	-78	14	128 ^A	47	-61	69
Hydroxide Alkalinity as CaCO ₃	mg/L	-	-	-	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO ₃	mg/L	-	-	-	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO ₃	mg/L	750	400	750	1	216	334	355	353	300	242	245	214	224	223	196	239
Total Alkalinity as CaCO ₃	mg/L	-	-	-	1	216	334	355	353	300	242	245	214	224	223	196	239
Sulfate as SO ₄	mg/L	250	300	250	1	<10	<1	<1	25	<1	<1	<1	<1	3	1	2	<1
Chloride (Cl)	mg/L	300	6,900	300	1	16	63	65	62	46	31	33	25	15	19	19	21
Calcium (Ca)	mg/L	-	-	-	1	117	131	124	151	77	83	81	86	82	103	65	95
Magnesium (Mg)	mg/L	50	420	50	1	14	12	11	12	7	9	8	7	8	10	6	9
Sodium (Na)	mg/L	400	5,500	400	1	38	44	47	54	19	29	26	23	14	18	16	21
Potassium (K)	mg/L	50	170	50	1	4	4	4	4	2	3	2	2	2	3	2	3
Iron (Fe)	mg/L	6	4	6	0.05	1.84	3.89	3.80	4.30	0.14	0.65	0.52	0.42	2.72	5.94	0.58	0.80
Fluoride (F)	mg/L	-	-	-	0.1	0.3	0.2	-	-	0.2	0.3	-	-	0.3	0.2	-	-
Ammonium as N	mg/L	-	-	-	0.01	0.41	0.24	-	0.23	0.32	0.50	-	0.36	0.35	0.63	-	0.43
Ammonia as N	mg/L	20	1	20	0.01	0.41	0.24	0.27	0.23	0.33	0.51	0.46	0.37	0.36	0.64	0.44	0.44
Nitrite as N	mg/L	-	-	-	0.01	<0.01	<0.01	<0.01	<0.01	0.09	<0.01	<0.01	<0.01	0.04	<0.01	<0.01	<0.01
Nitrate as N	mg/L	-	-	-	0.01	5.45	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	0.01	<0.01
Nitrite + Nitrate as N	mg/L	-	-	-	0.01	5.45	<0.01	<0.01	<0.01	0.04	<0.01	<0.01	<0.01	<0.01	0.02	0.01	<0.01
Total Kjeldahl Nitrogen as N	mg/L	-	-	-	0.1	2.5	1.2	1.2	1.3	0.8	0.7	0.7	0.8	0.9	1.5	0.9	1.1
Total Nitrogen as N	mg/L	0.1 - 0.5	-	0.1 - 0.5	0.1	8.0	1.2	1.2	1.3	0.8	0.7	0.7	0.8	0.9	1.5	0.9	1.1
Total Phosphorus as P	mg/L	0.005 - 0.5	0.004	0.005 - 0.5	0.01	0.09	0.18	0.17	0.16	0.08	0.11	0.12	0.09	0.33	0.67	0.14	0.10
Total Anions	meq/L	-	-	-	0.01	4.77	8.45	8.93	-	7.29	5.71	5.82	-	4.96	5.01	4.49	-
Total Cations	meq/L	-	-	-	0.01	4.81	8.11	9.24	-	8.10	5.40	5.88	-	4.92	4.66	4.48	-
Ionic Balance	%	-	-	-	0.01	0.50	2.05	1.72	-	5.23	2.76	0.48	-	0.39	3.62	0.10	-
Thermotolerant Coliforms	CFU/100mL	<1,000	-	<1,000	1	<1	~1	<1	<1	<1	<1	<1	<1	<1	<1	~1	<1
Escherichia coli	CFU/100mL	<230	-	<230	1	<1	~1	<1	<1	<1	<1	<1	<1	<1	<1	~1	<1
Enterococci	CFU/100mL	-	-	-	1	<1	~3	<1	<1	<1	<1	<1	<1	<1	16	<1	<1

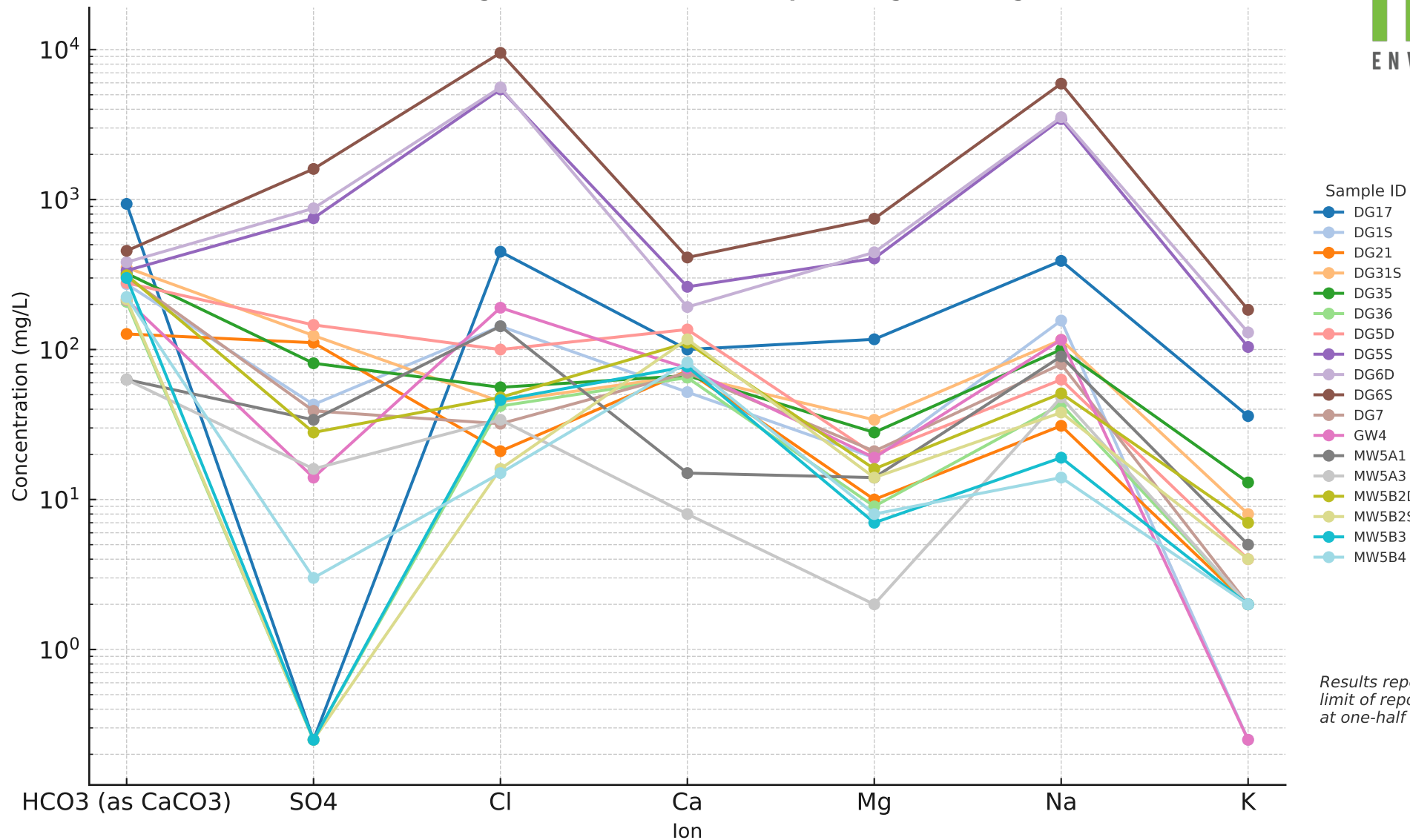
A. Water quality parameters recorded on 23 August 2024.

1. Generic trigger values provided in Development Consent 195-8-2004

2. Stages 2-4 specific trigger values provided in EES (2018) GMMP

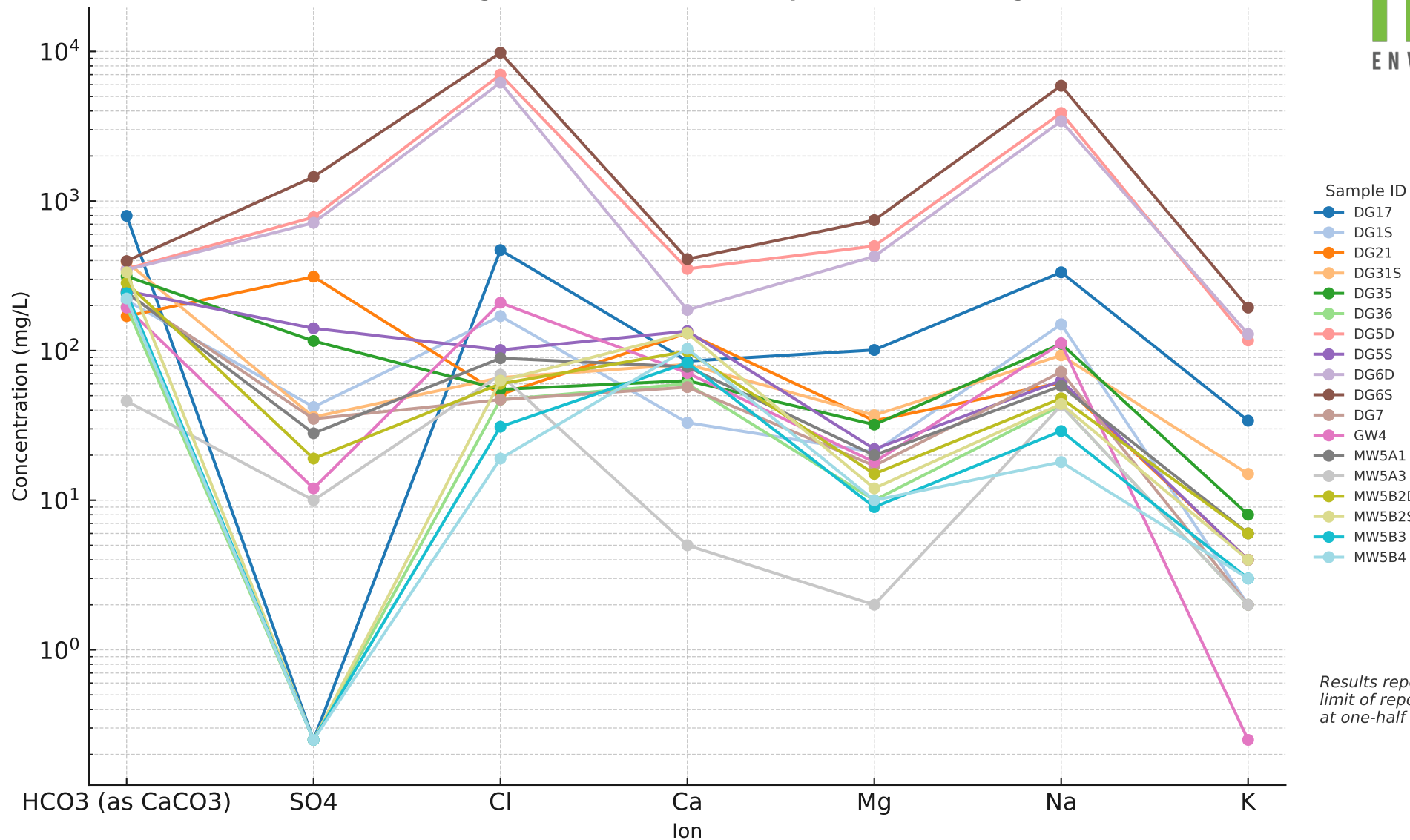
3. Stage 5 specific trigger values provided in EMM (2021) SWMP

Schoeller Diagram - Groundwater Samples (Aug 2024, mg/L)



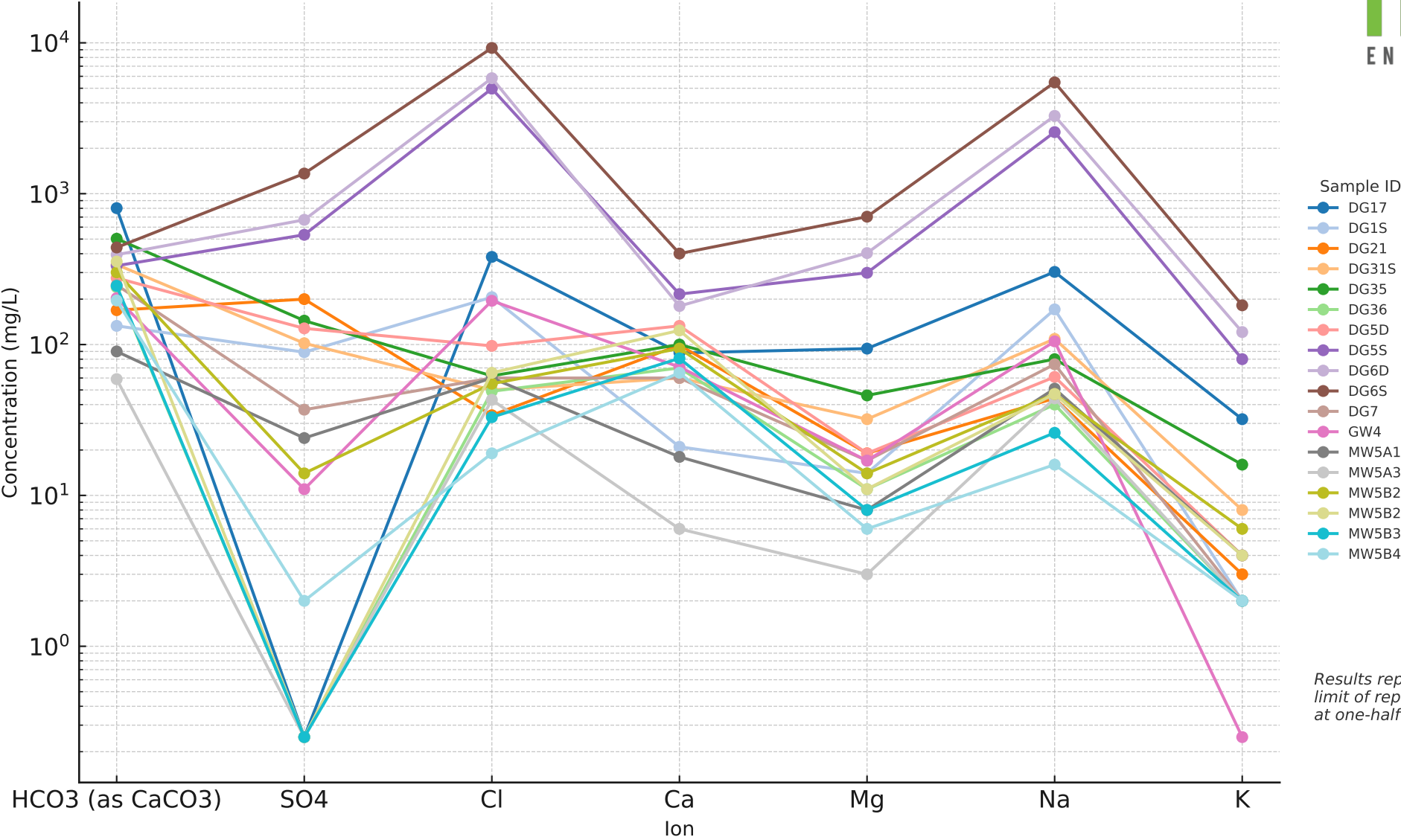
Results reported as below the analytical limit of reporting (LOR) have been plotted at one-half the LOR value.

Schoeller Diagram - Groundwater Samples (Nov 2024, mg/L)



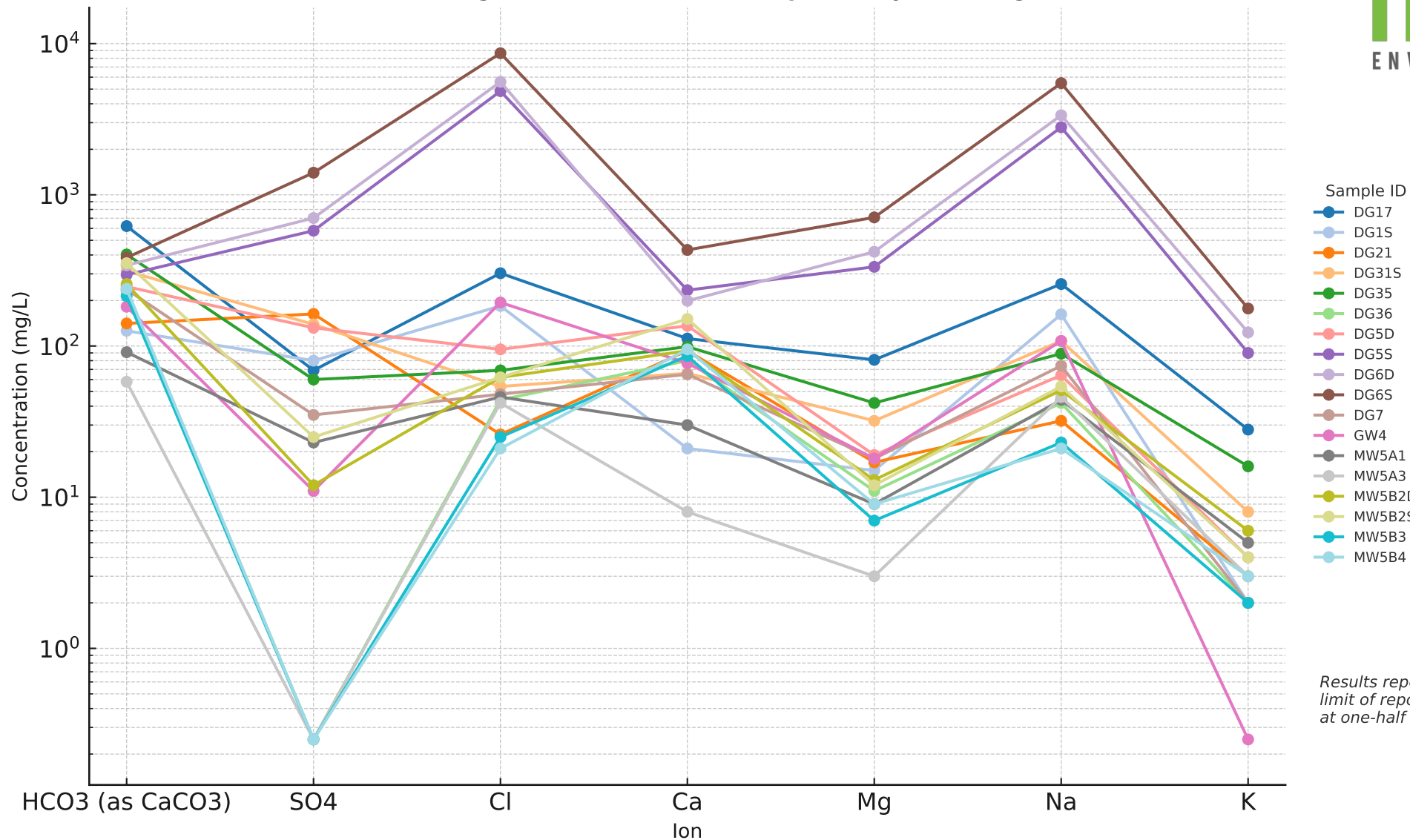
Results reported as below the analytical limit of reporting (LOR) have been plotted at one-half the LOR value.

Schoeller Diagram - Groundwater Samples (Feb 2025, mg/L)



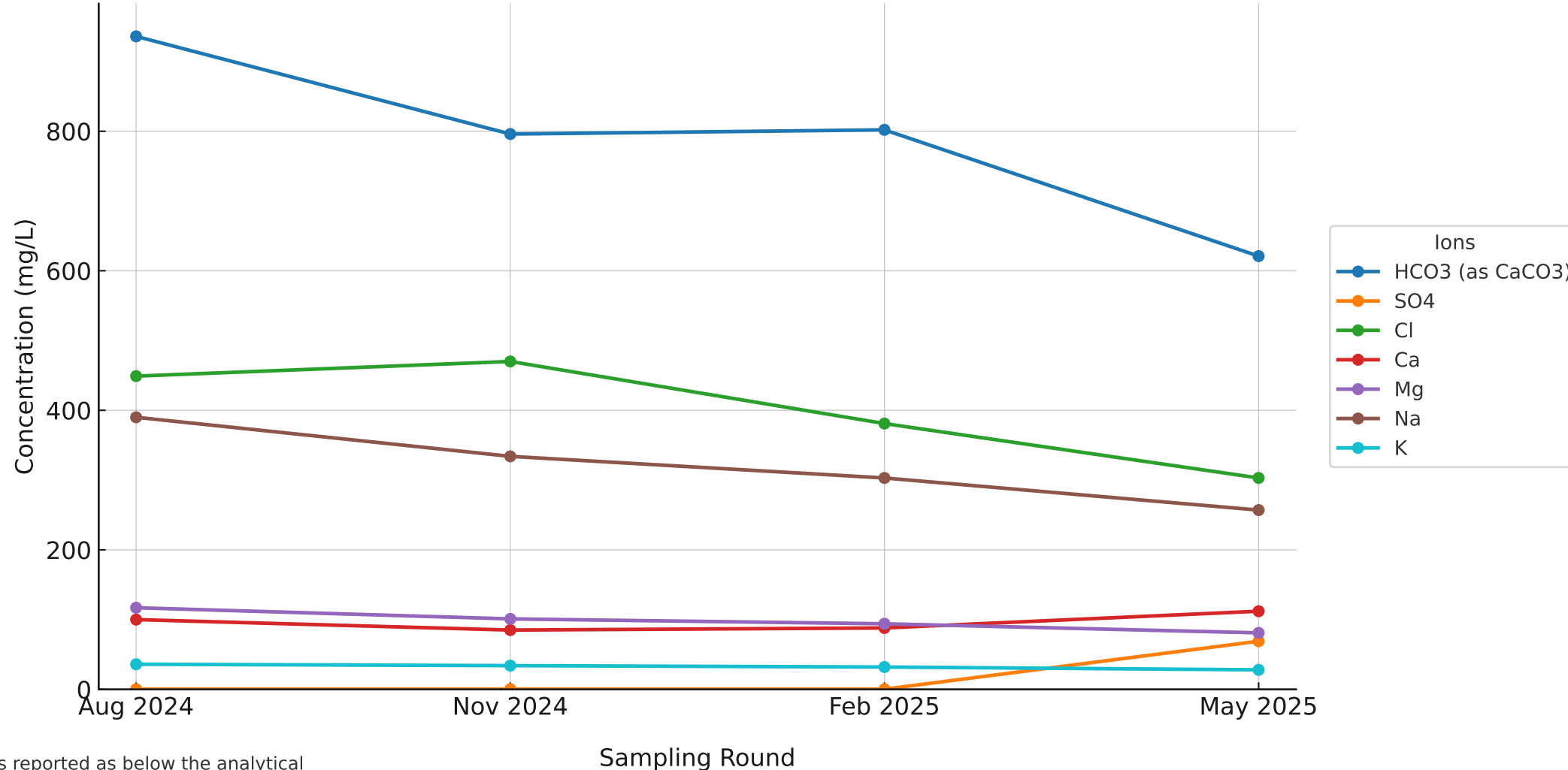
Results reported as below the analytical limit of reporting (LOR) have been plotted at one-half the LOR value.

Schoeller Diagram - Groundwater Samples (May 2025, mg/L)



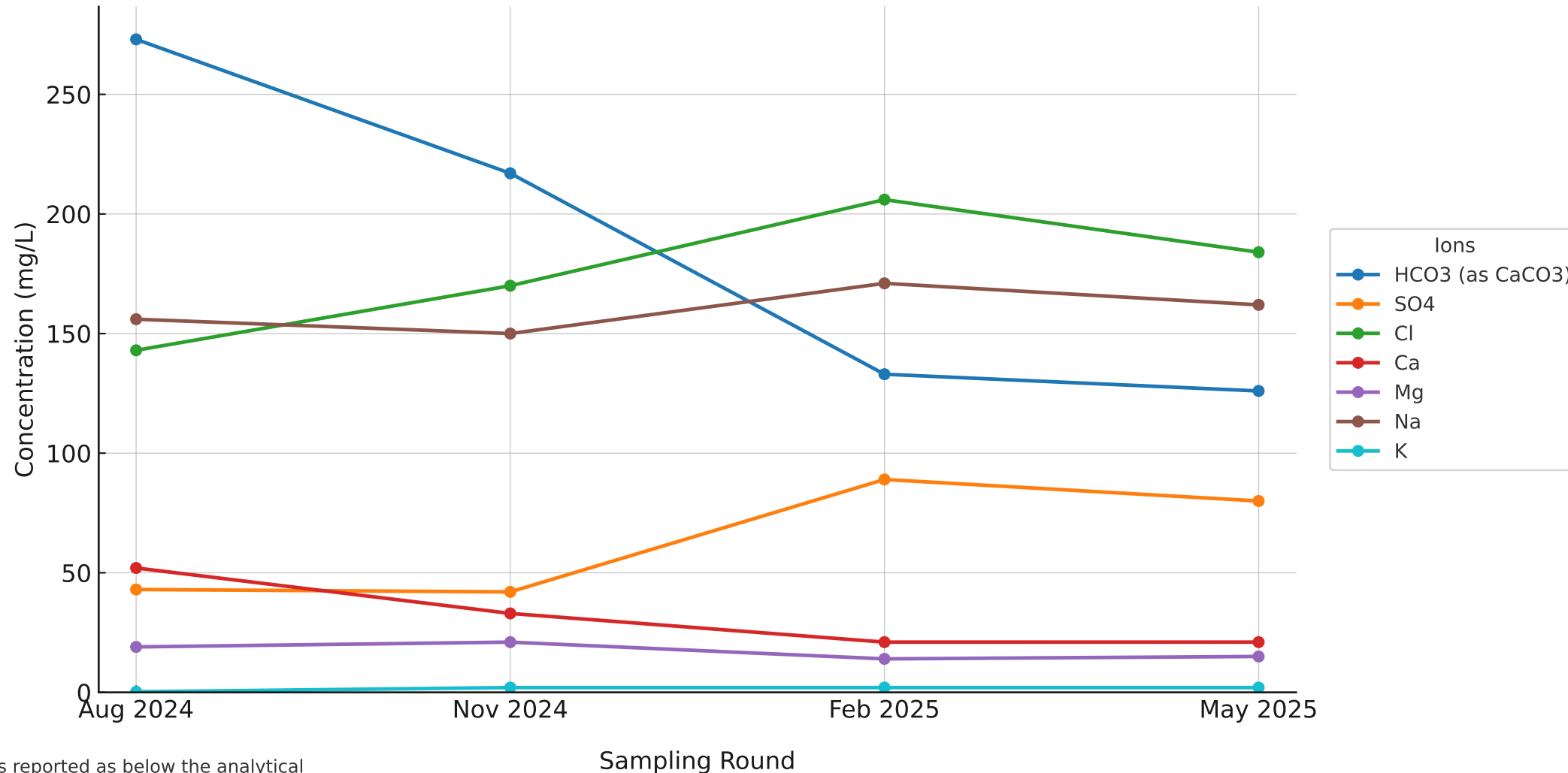
Results reported as below the analytical limit of reporting (LOR) have been plotted at one-half the LOR value.

Ion concentrations over time - DG17



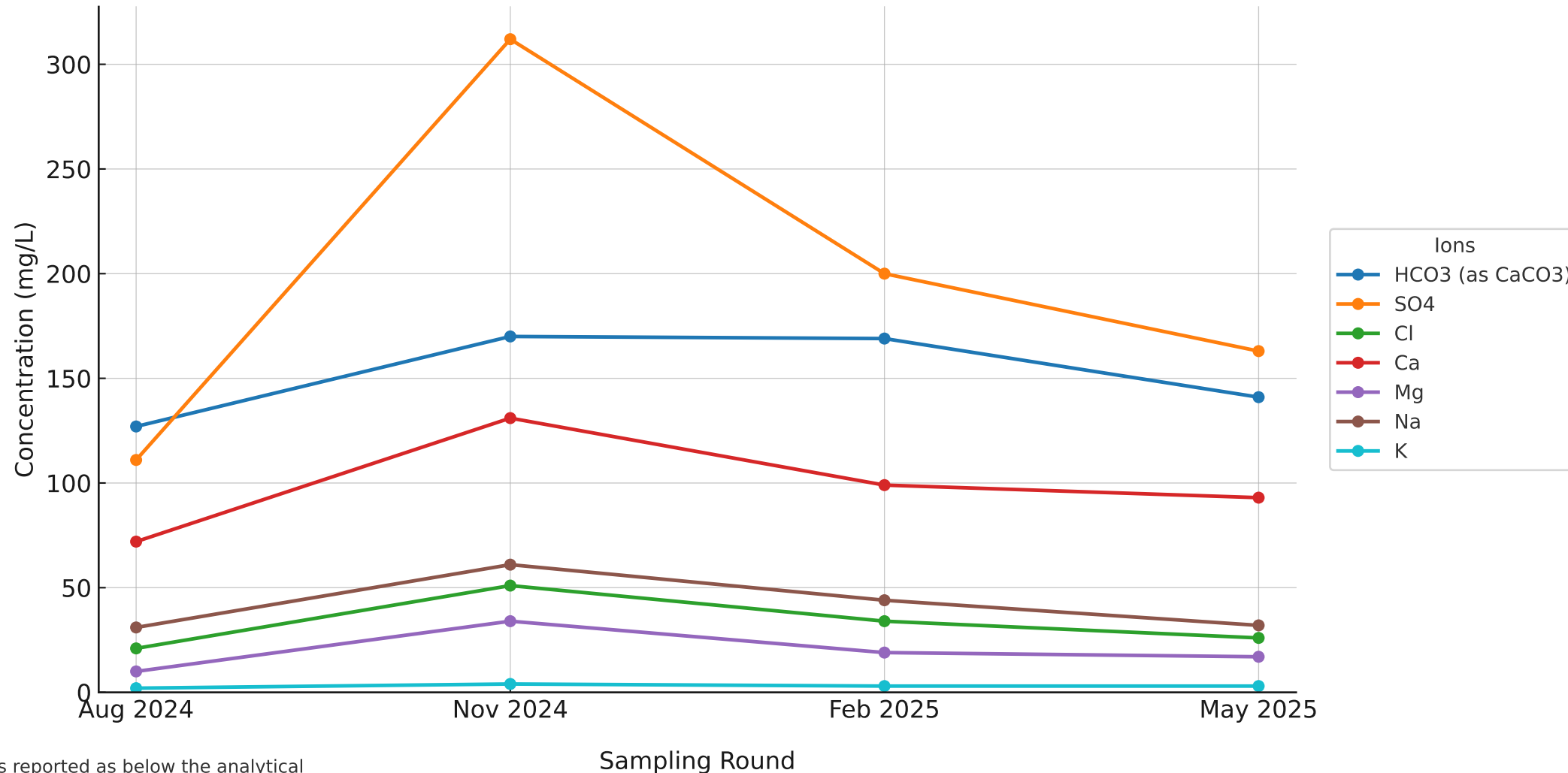
Results reported as below the analytical limit of reporting (LOR) have been plotted at one-half the LOR value.

Ion concentrations over time - DG21



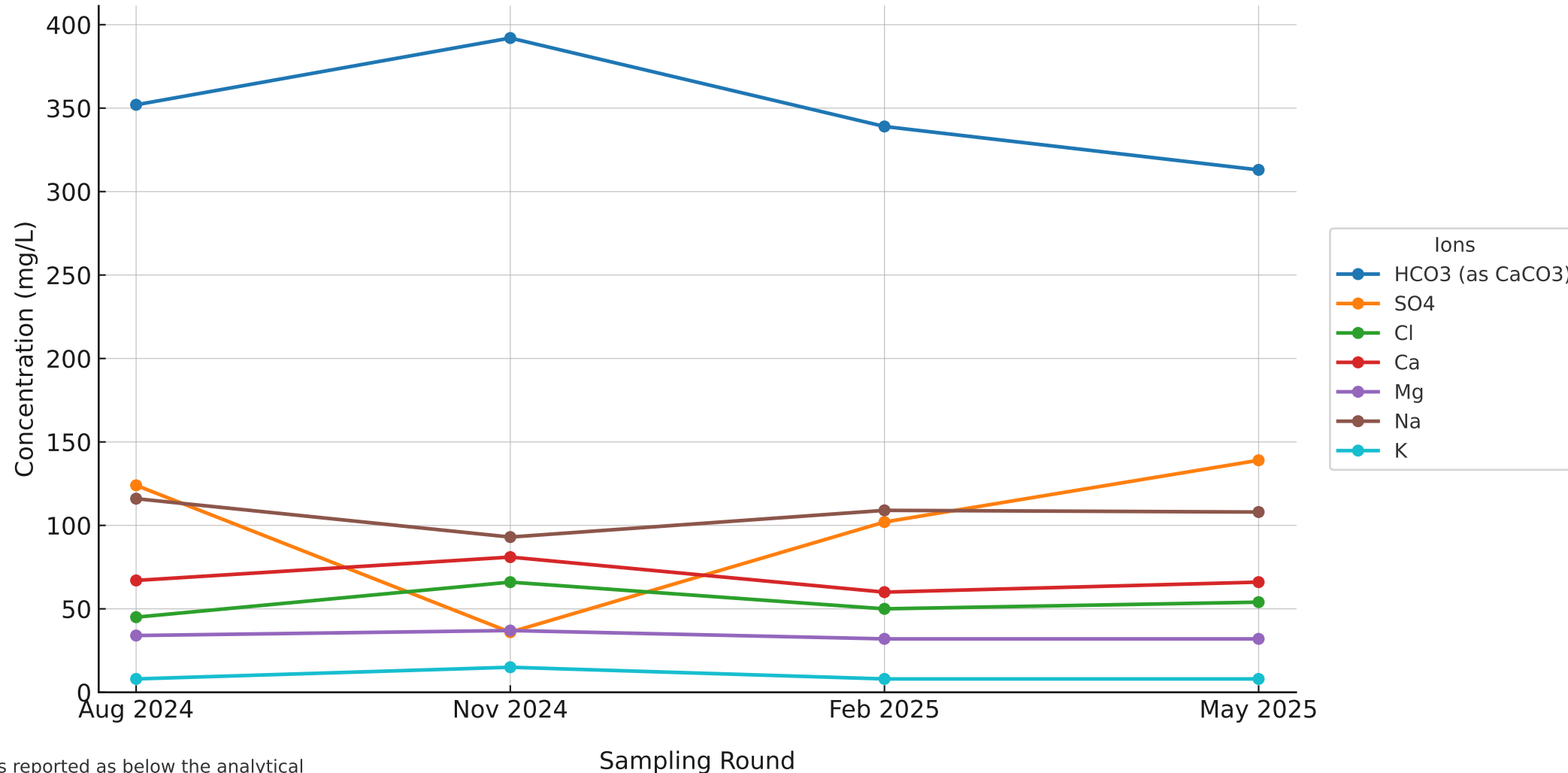
Results reported as below the analytical limit of reporting (LOR) have been plotted at one-half the LOR value.

Ion concentrations over time - DG31S



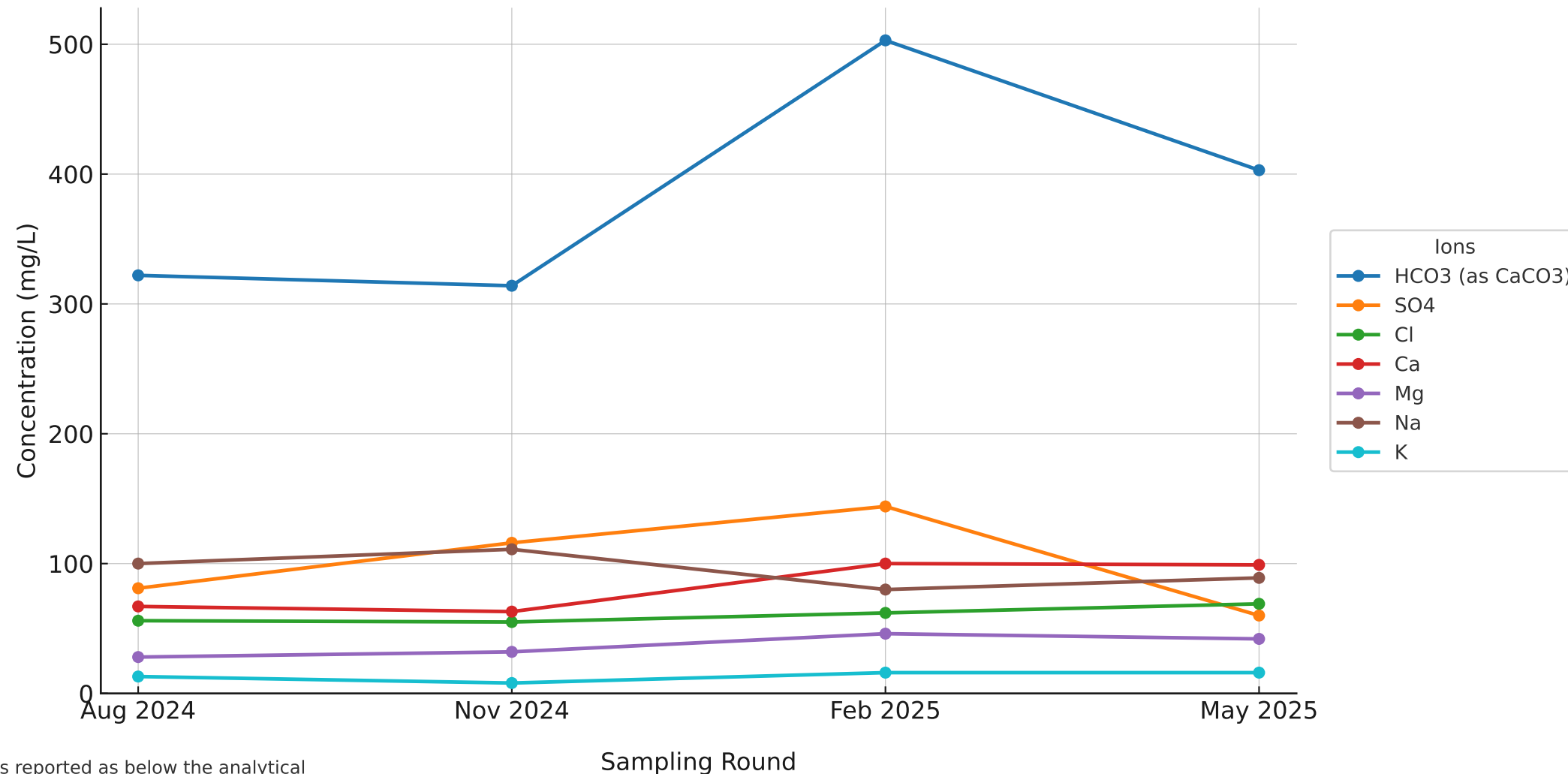
Results reported as below the analytical limit of reporting (LOR) have been plotted at one-half the LOR value.

Ion concentrations over time - DG35



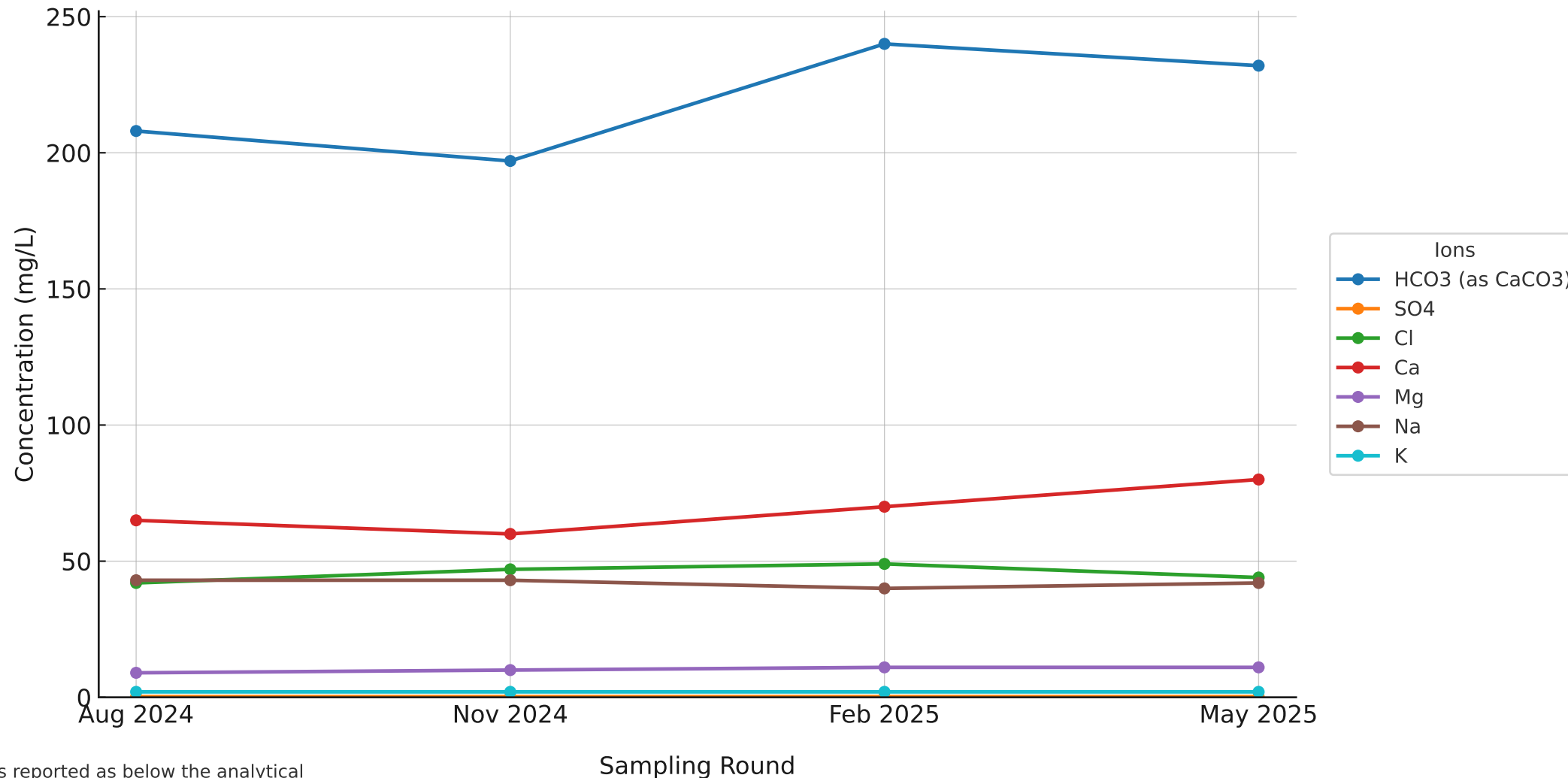
Results reported as below the analytical limit of reporting (LOR) have been plotted at one-half the LOR value.

Ion concentrations over time - DG36



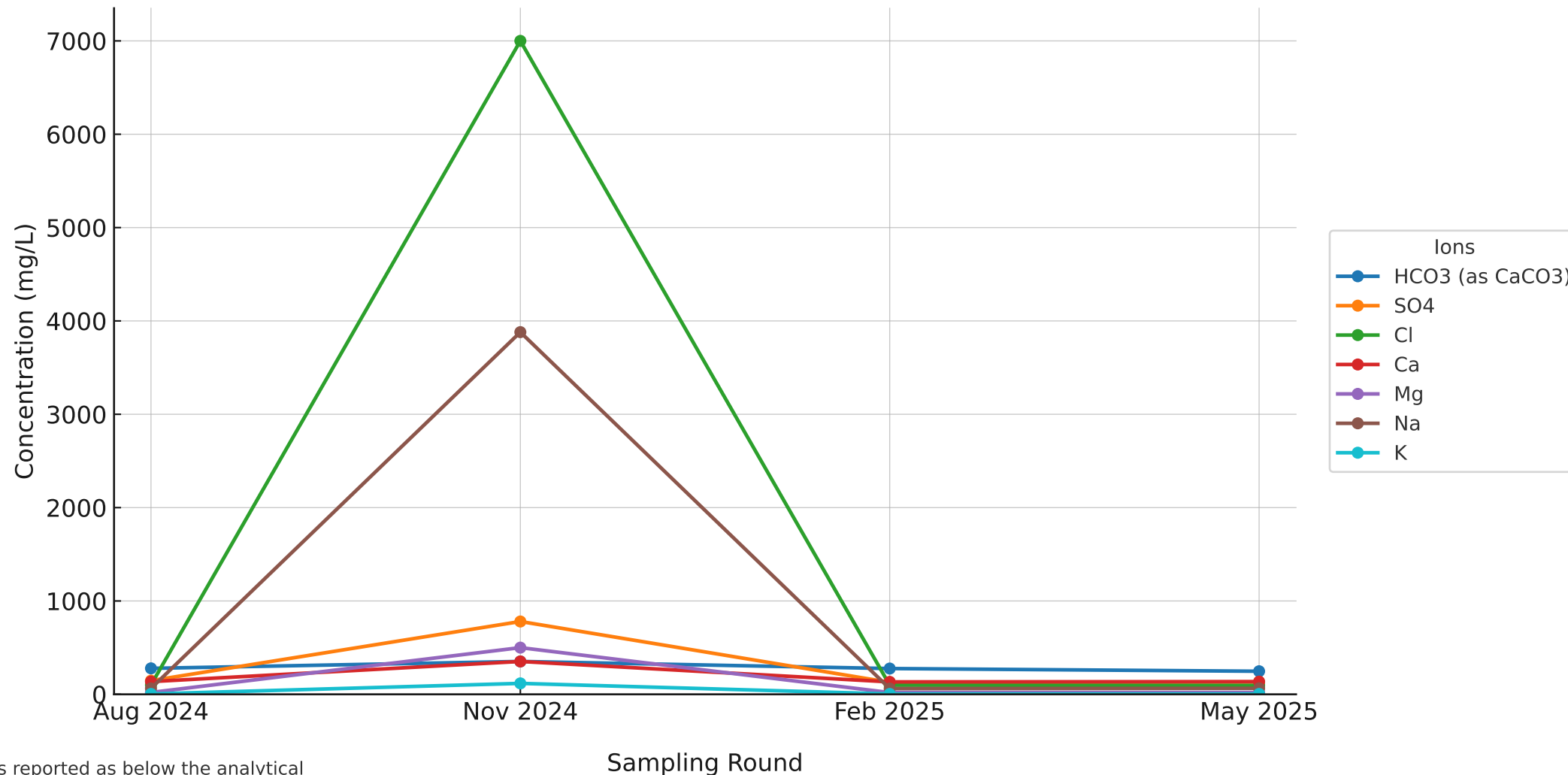
Results reported as below the analytical limit of reporting (LOR) have been plotted at one-half the LOR value.

Ion concentrations over time - DG1S



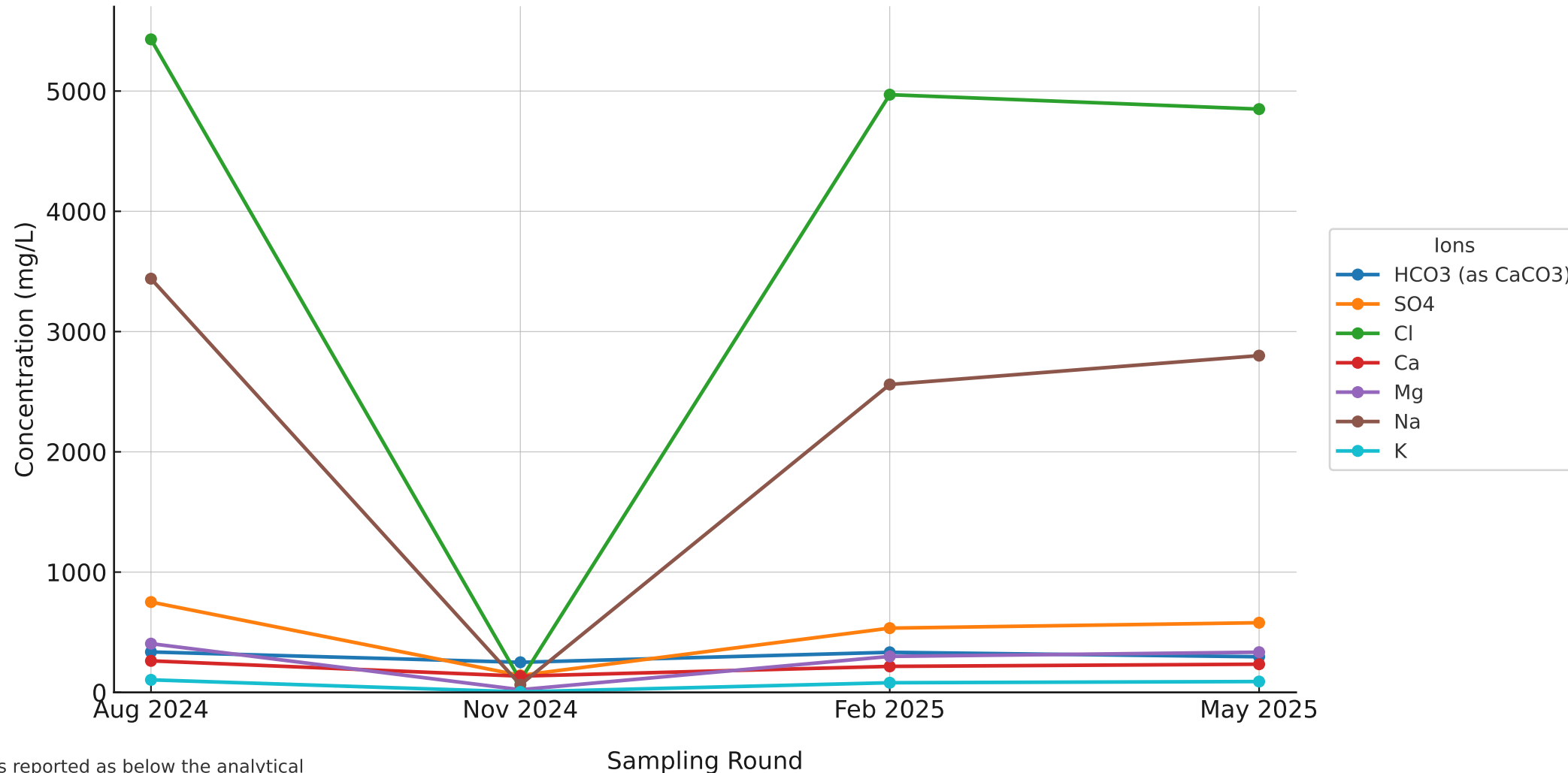
Results reported as below the analytical limit of reporting (LOR) have been plotted at one-half the LOR value.

Ion concentrations over time - DG5S



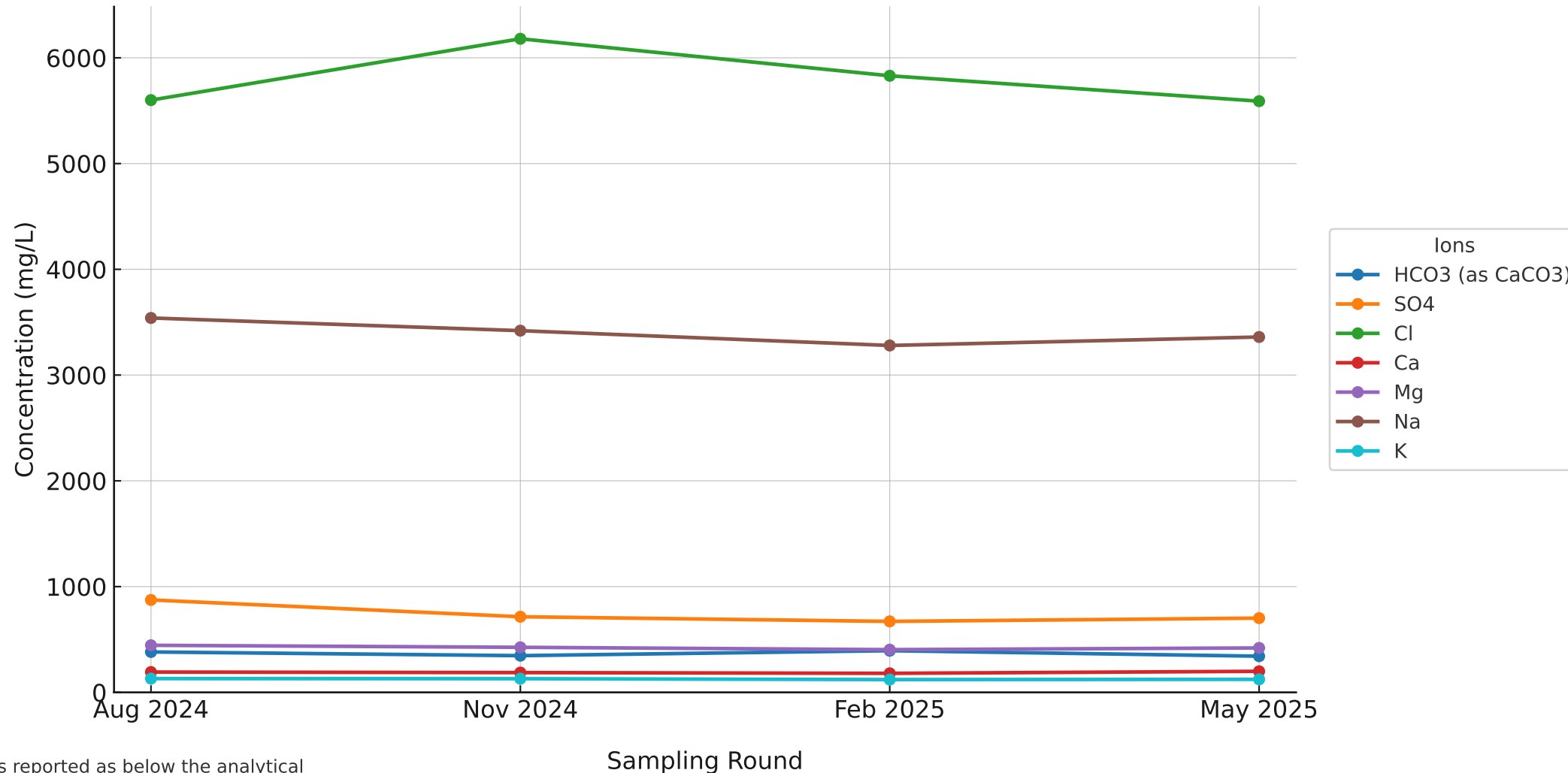
Results reported as below the analytical limit of reporting (LOR) have been plotted at one-half the LOR value.

Ion concentrations over time - DG5D



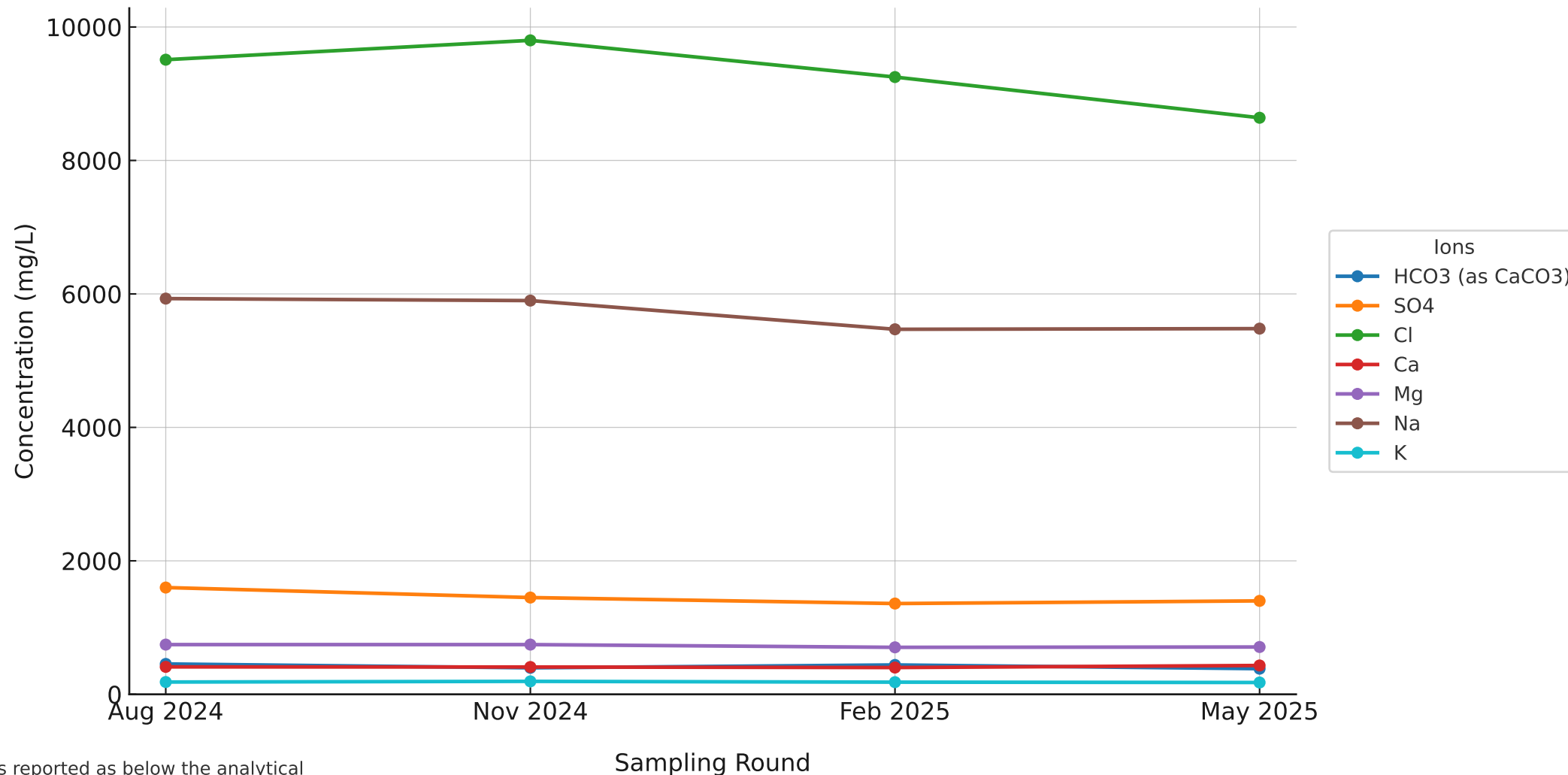
Results reported as below the analytical limit of reporting (LOR) have been plotted at one-half the LOR value.

Ion concentrations over time - DG6S



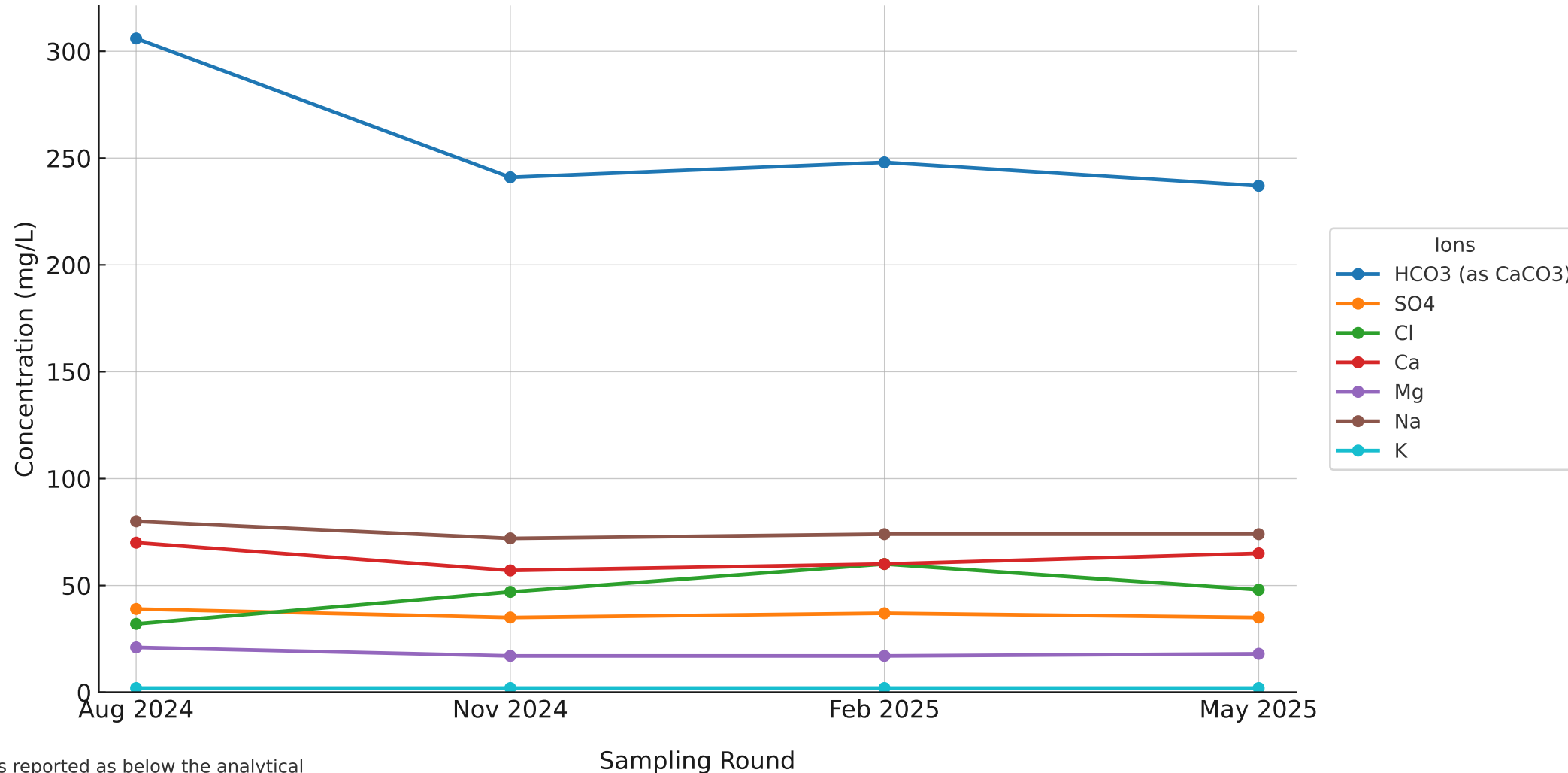
Results reported as below the analytical limit of reporting (LOR) have been plotted at one-half the LOR value.

Ion concentrations over time - DG6D



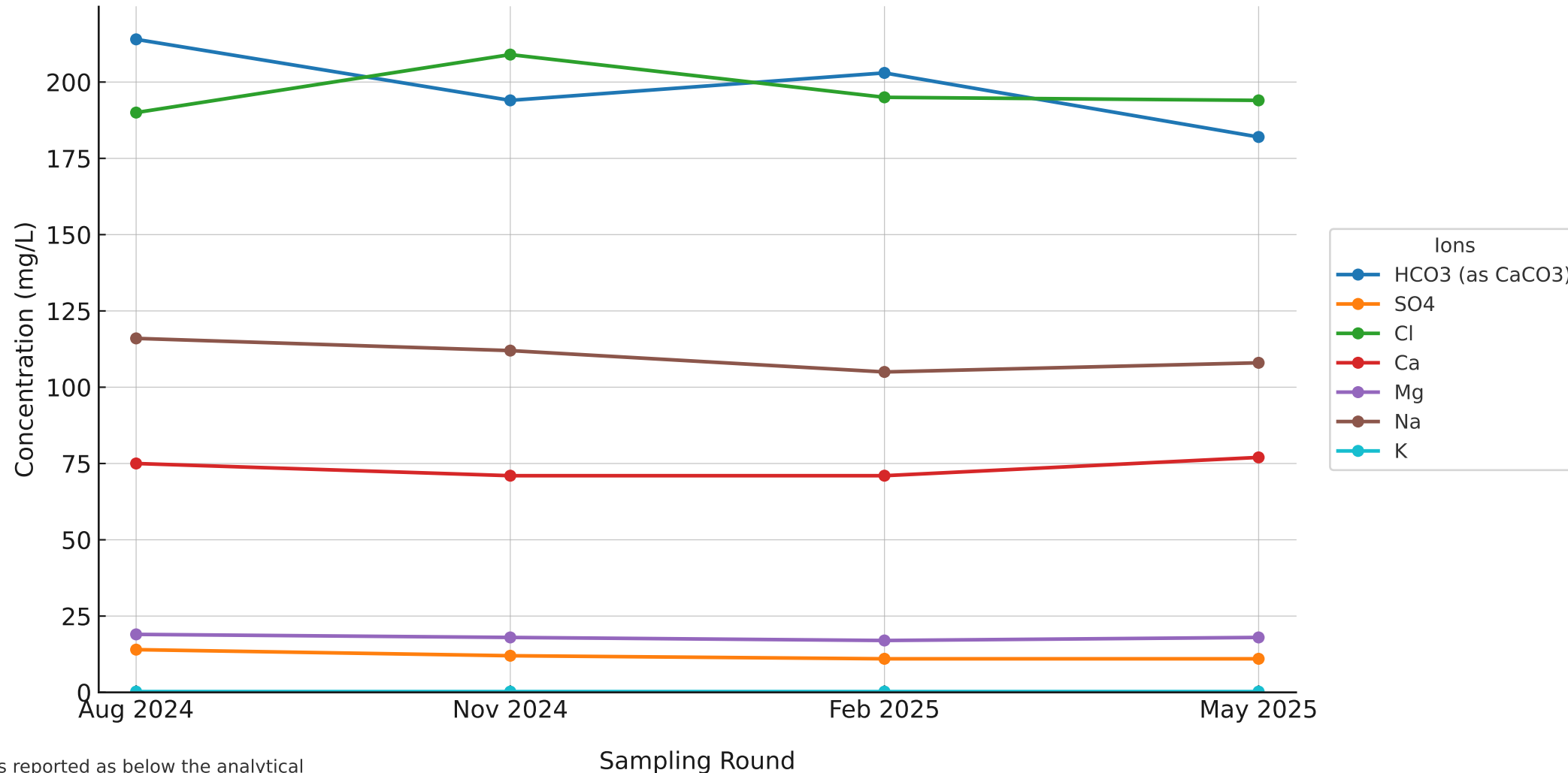
Results reported as below the analytical limit of reporting (LOR) have been plotted at one-half the LOR value.

Ion concentrations over time - DG7



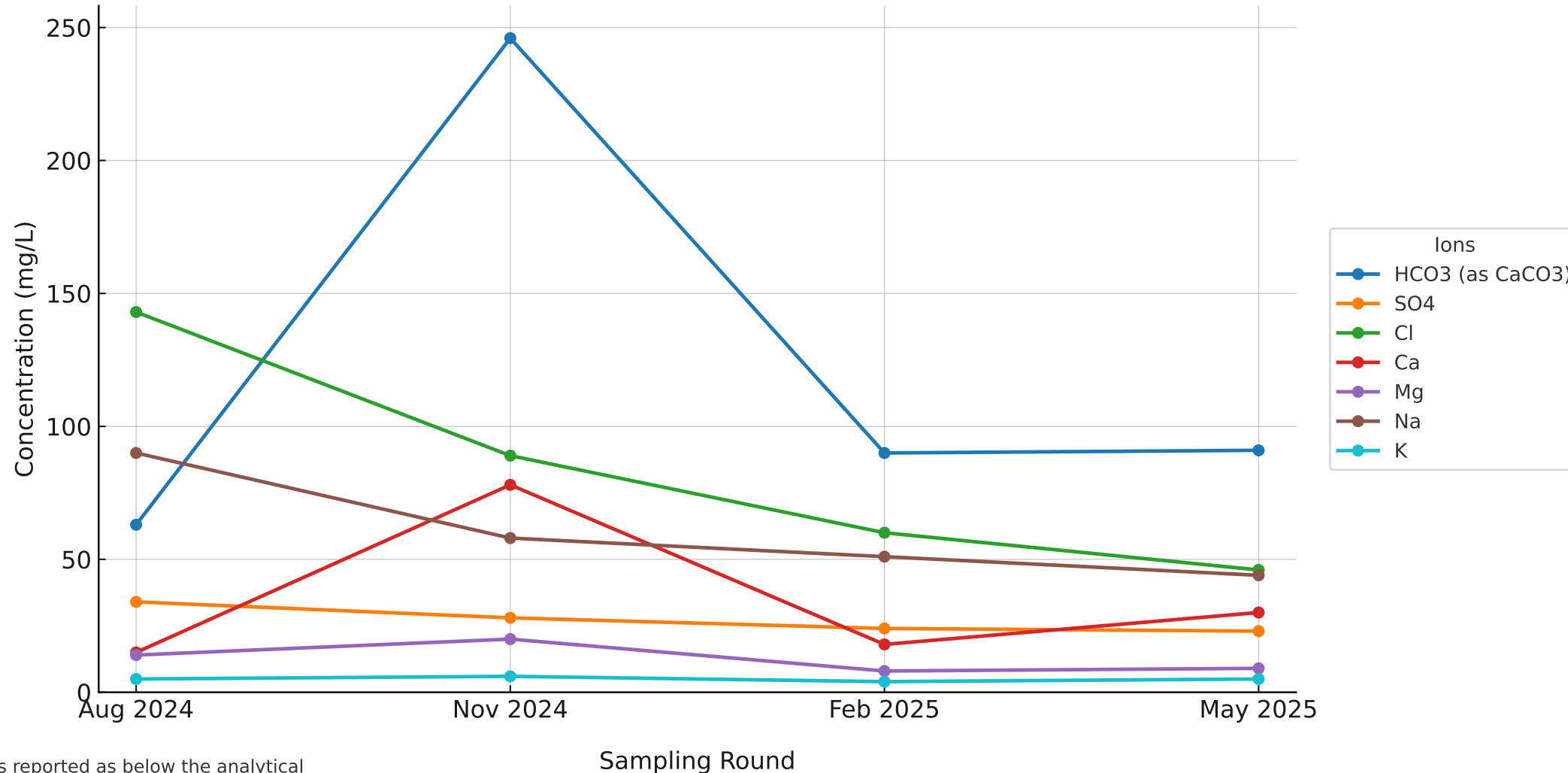
Results reported as below the analytical limit of reporting (LOR) have been plotted at one-half the LOR value.

Ion concentrations over time - GW4



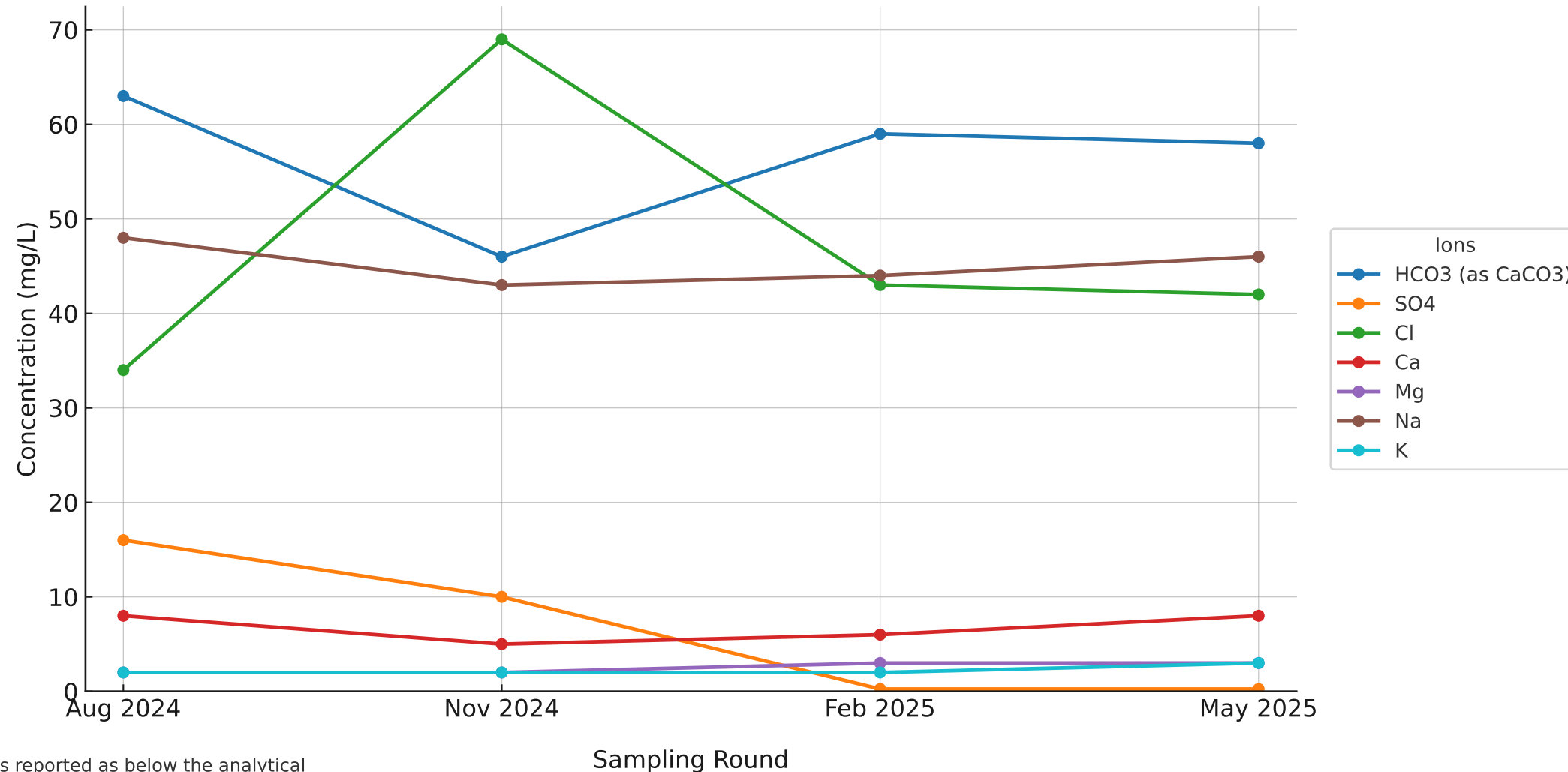
Results reported as below the analytical limit of reporting (LOR) have been plotted at one-half the LOR value.

Ion concentrations over time - MW5A1



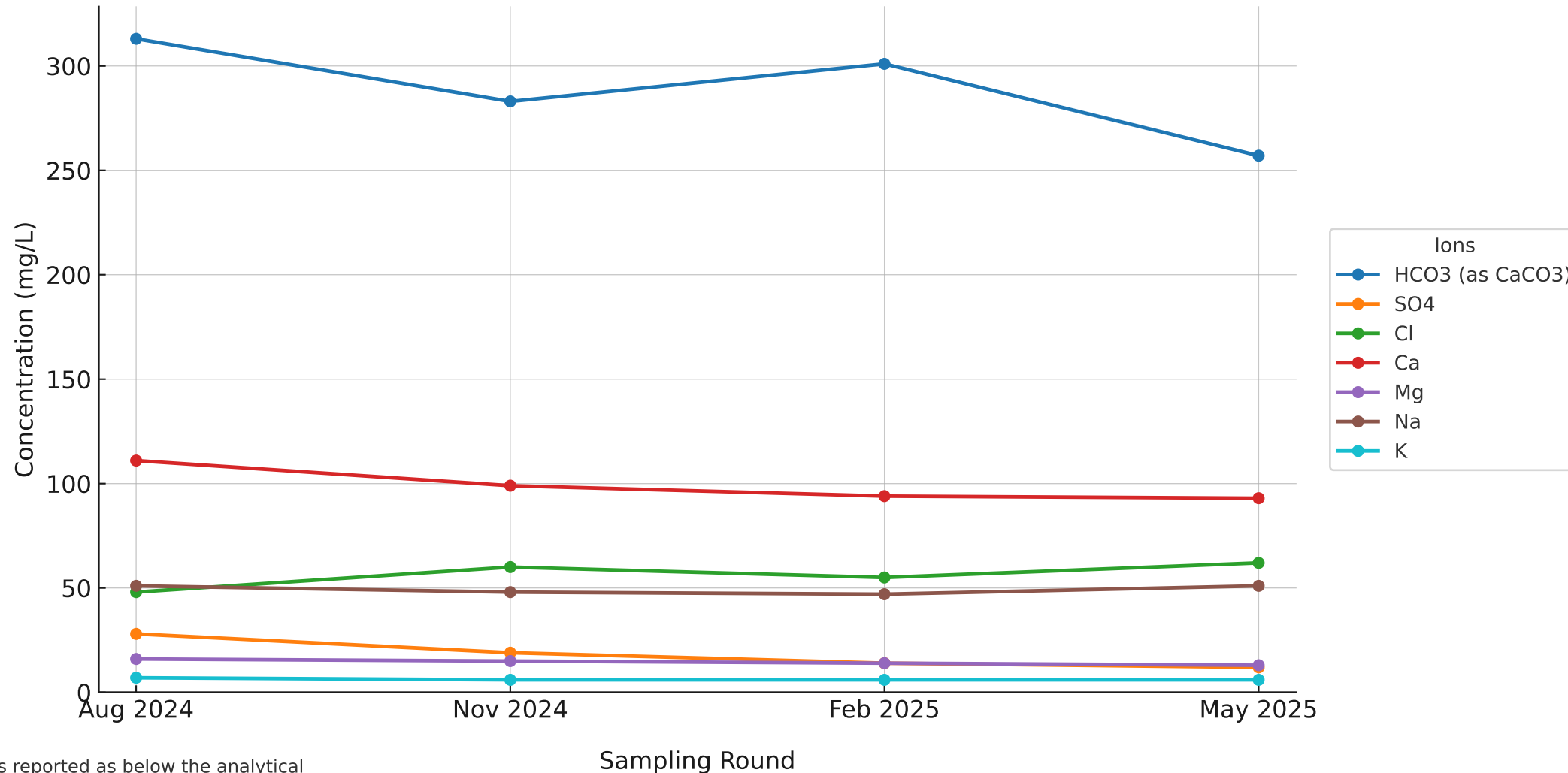
Results reported as below the analytical limit of reporting (LOR) have been plotted at one-half the LOR value.

Ion concentrations over time - MW5A3



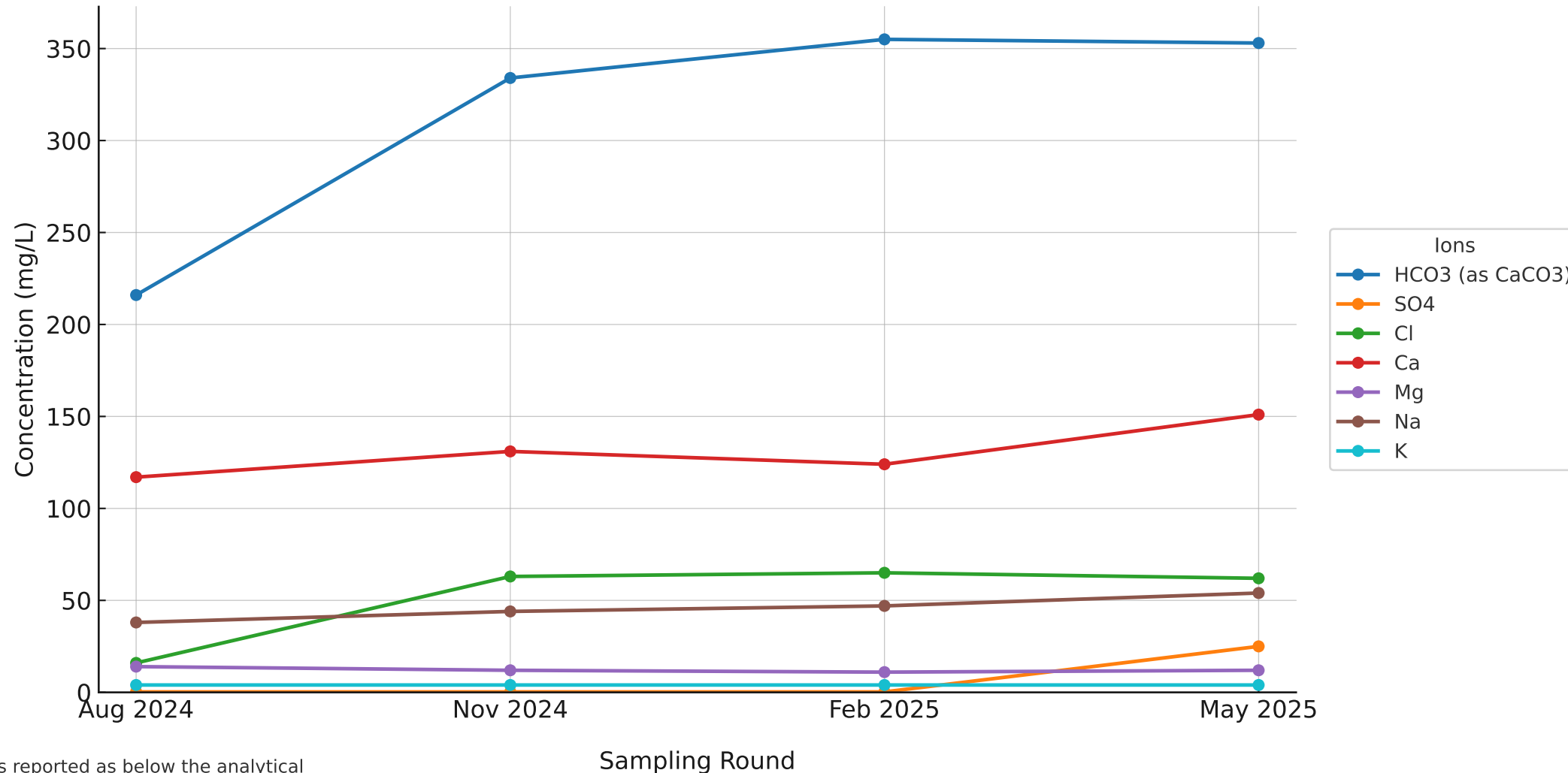
Results reported as below the analytical limit of reporting (LOR) have been plotted at one-half the LOR value.

Ion concentrations over time - MW5B2D



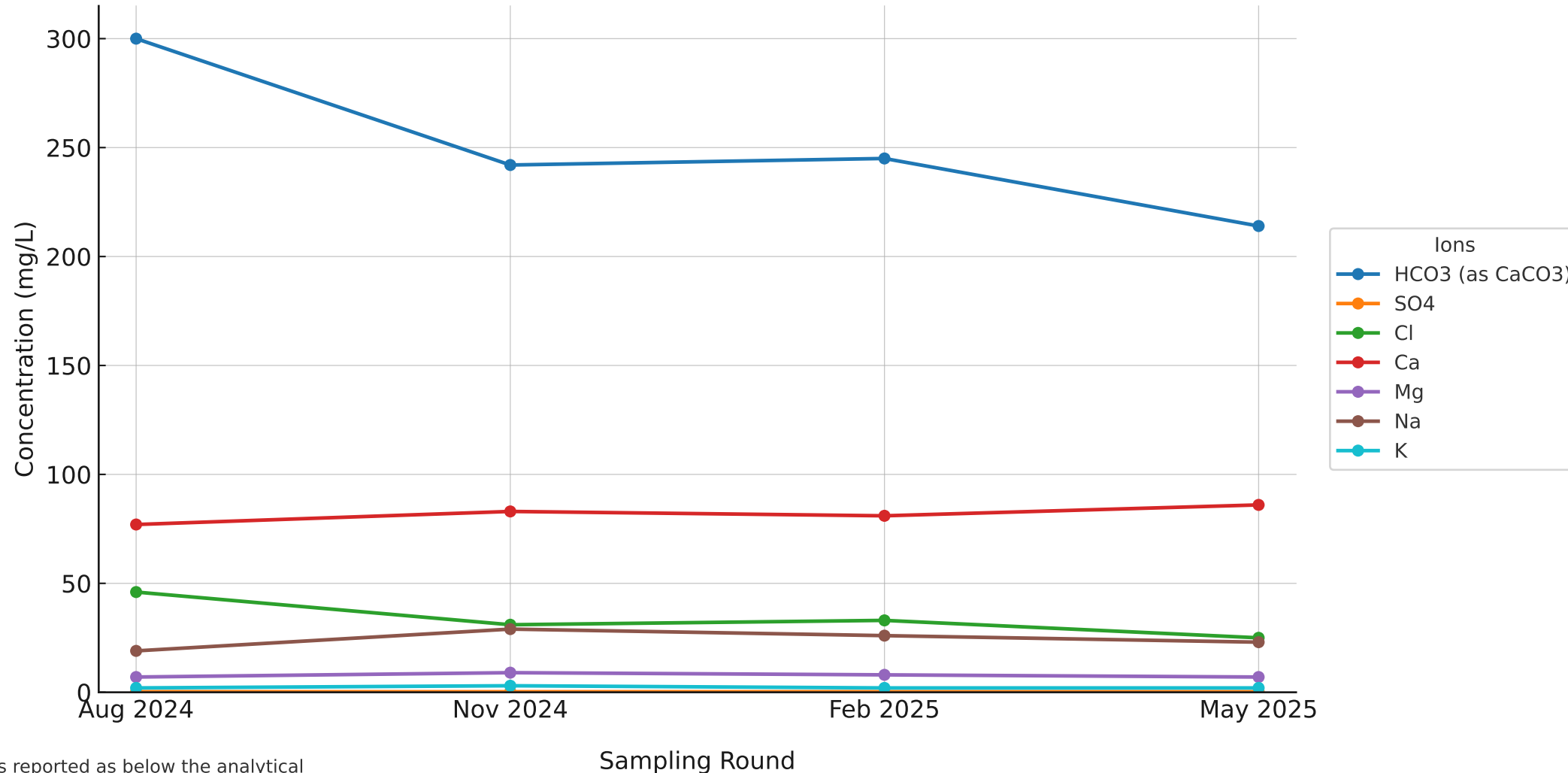
Results reported as below the analytical limit of reporting (LOR) have been plotted at one-half the LOR value.

Ion concentrations over time - MW5B2S



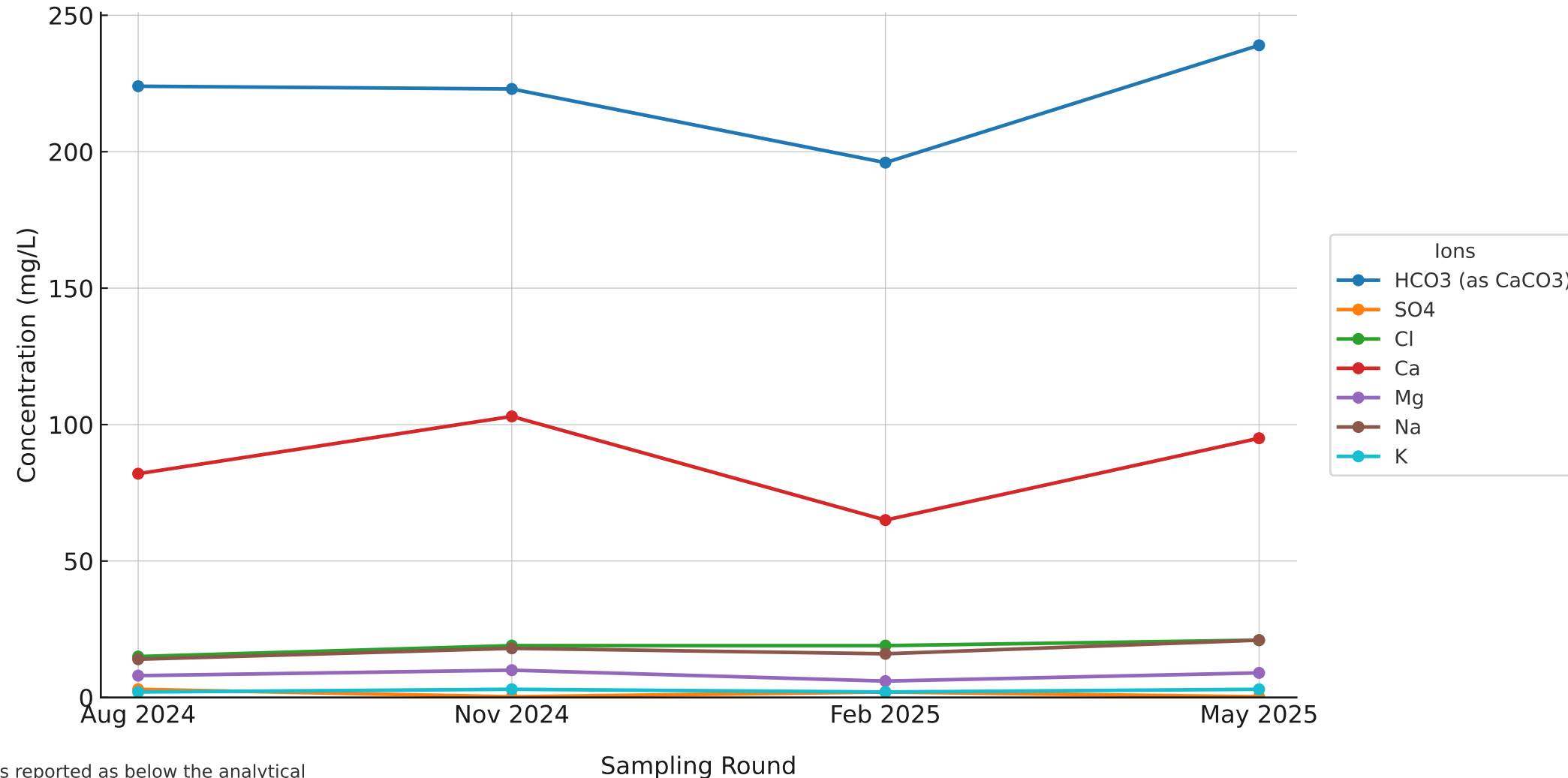
Results reported as below the analytical limit of reporting (LOR) have been plotted at one-half the LOR value.

Ion concentrations over time - MW5B3



Results reported as below the analytical limit of reporting (LOR) have been plotted at one-half the LOR value.

Ion concentrations over time - MW5B4



Results reported as below the analytical limit of reporting (LOR) have been plotted at one-half the LOR value.

Appendix C

Laboratory Analytical Reports



CERTIFICATE OF ANALYSIS

Work Order : EW2404036
Client : BORAL LIMITED
Contact : Matt Bray
Address : Boral Dunmore Sand and Soil 38 Tabbita Road
DUNMORE 2529
Telephone : ----
Project : Quarterly Dunmore Sand & Soil Groundwater
Order number : 6896476
C-O-C number : ----
Sampler : Client - Matt Bray
Site : ----
Quote number : EW24BLUCIR0001
No. of samples received : 18
No. of samples analysed : 18

Page : 1 of 11
Laboratory : Environmental Division NSW South Coast
Contact : Aneta Prosaroski
Address : 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia
Telephone : 02 42253125
Date Samples Received : 30-Aug-2024 15:17
Date Analysis Commenced : 30-Aug-2024
Issue Date : 06-Sep-2024 15:51



Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Sarah Griffiths	Microbiologist	Sydney Microbiology, Smithfield, NSW



General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- MF = membrane filtration
- CFU = colony forming unit
- Microbiological Comment: In accordance with ALS work instruction QWI-MIC/04, membrane filtration result is reported an approximate (~) when the count of colonies on the filtered membrane is outside the range of 10 - 100cfu.
- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO2 and Fluoride to the Anions.
- MW006 is ALS's internal code and is equivalent to AS4276.5.
- ED041G: LOR raised for Sulfate on sample nos.1 and 6 due to sample matrix.
- ED041G: LOR raised for sample #16 due to matrix interference.
- EK057G/EK059G: NOx is less than NO2 for samples 17 and 18, however, these results have been confirmed by re-analysis.
- MW023 is ALS's internal code and is equivalent to AS4276.9.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	DG17	DG21	DG31S	DG35	DG36
Sampling date / time					29-Aug-2024 10:15	29-Aug-2024 11:10	29-Aug-2024 11:00	29-Aug-2024 10:50	29-Aug-2024 10:40
Compound	CAS Number	LOR	Unit		EW2404036-001	EW2404036-002	EW2404036-003	EW2404036-004	EW2404036-005
				Result	Result	Result	Result	Result	Result
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser - Continued									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		1.8	1.5	0.5	1.8	0.4
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		1.8	1.5	1.5	1.8	0.4
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		2.84	0.33	0.04	1.10	0.19
EN055: Ionic Balance									
ø Total Anions	----	0.01	meq/L		31.4	10.4	5.44	10.9	9.70
ø Total Cations	----	0.01	meq/L		31.0	10.3	5.32	10.7	9.84
ø Ionic Balance	----	0.01	%		0.61	0.45	1.10	0.83	0.72
MW006: Faecal Coliforms & E.coli by MF									
Thermotolerant Coliforms	----	1	CFU/100mL		<1	<1	<1	<1	<1
<i>Escherichia coli</i>	----	1	CFU/100mL		<1	<1	<1	<1	<1
MW023: Enterococci by Membrane Filtration									
<i>Enterococci</i>	----	1	CFU/100mL		<1	<1	<1	<1	<1



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	DG1S	DG5S	DG5D	DG6S	DG6D
Sampling date / time					29-Aug-2024 12:00	29-Aug-2024 09:00	29-Aug-2024 09:05	29-Aug-2024 09:15	29-Aug-2024 09:20
Compound	CAS Number	LOR	Unit		EW2404036-006	EW2404036-007	EW2404036-008	EW2404036-009	EW2404036-010
					Result	Result	Result	Result	Result
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser - Continued									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		1.4	0.9	2.2	1.5	1.7
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		1.4	0.9	2.2	1.5	1.7
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		0.20	0.16	0.54	0.25	0.47
EN055: Ionic Balance									
ø Total Anions	----	0.01	meq/L		5.34	11.4	176	184	311
ø Total Cations	----	0.01	meq/L		5.51	10.5	191	192	336
ø Ionic Balance	----	0.01	%		1.59	4.17	4.16	2.08	3.89
MW006: Faecal Coliforms & E.coli by MF									
Thermotolerant Coliforms	----	1	CFU/100mL		<1	<1	<1	<1	<1
Escherichia coli	----	1	CFU/100mL		<1	<1	<1	<1	<1
MW023: Enterococci by Membrane Filtration									
Enterococci	----	1	CFU/100mL		<1	<1	<1	<1	<1



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	DG7	DW4	MW5A1	MW5A3	MW5B2D
Sampling date / time					29-Aug-2024 13:20	29-Aug-2024 11:50	29-Aug-2024 09:45	29-Aug-2024 10:00	29-Aug-2024 12:30
Compound	CAS Number	LOR	Unit		EW2404036-011	EW2404036-012	EW2404036-013	EW2404036-014	EW2404036-015
					Result	Result	Result	Result	Result
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser - Continued									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		1.9	0.6	1.3	1.1	1.1
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
[^] Total Nitrogen as N	----	0.1	mg/L		1.9	0.6	1.3	1.1	1.1
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		0.23	0.07	0.09	0.13	0.11
EN055: Ionic Balance									
∅ Total Anions	----	0.01	meq/L		7.83	9.93	6.00	2.55	8.19
∅ Total Cations	----	0.01	meq/L		8.18	9.81	5.58	2.65	8.60
∅ Ionic Balance	----	0.01	%		2.22	0.60	3.58	----	2.45
MW006: Faecal Coliforms & E.coli by MF									
Thermotolerant Coliforms	----	1	CFU/100mL		<1	<1	<1	<1	<1
<i>Escherichia coli</i>	----	1	CFU/100mL		<1	<1	<1	<1	<1
MW023: Enterococci by Membrane Filtration									
<i>Enterococci</i>	----	1	CFU/100mL		<1	<1	<1	<1	<1



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MW5B2S	MW5B3	MW5B4	----	----
Sampling date / time					29-Aug-2024 12:40	29-Aug-2024 12:50	29-Aug-2024 13:00	----	----
Compound	CAS Number	LOR	Unit		EW2404036-016	EW2404036-017	EW2404036-018	-----	-----
				Result	Result	Result		----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser - Continued									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		2.5	0.8	0.9	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		8.0	0.8	0.9	----	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		0.09	0.08	0.33	----	----
EN055: Ionic Balance									
ø Total Anions	----	0.01	meq/L		4.77	7.29	4.96	----	----
ø Total Cations	----	0.01	meq/L		4.81	8.10	4.92	----	----
ø Ionic Balance	----	0.01	%		0.50	5.23	0.39	----	----
MW006: Faecal Coliforms & E.coli by MF									
Thermotolerant Coliforms	----	1	CFU/100mL		<1	<1	<1	----	----
Escherichia coli	----	1	CFU/100mL		<1	<1	<1	----	----
MW023: Enterococci by Membrane Filtration									
Enterococci	----	1	CFU/100mL		<1	<1	<1	----	----



Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry / Biology).

(WATER) MW023: Enterococci by Membrane Filtration

(WATER) EG020T: Total Metals by ICP-MS

(WATER) MW006: Faecal Coliforms & E.coli by MF

(WATER) EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser

(WATER) EK061G: Total Kjeldahl Nitrogen By Discrete Analyser

(WATER) EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser

(WATER) EK058G: Nitrate as N by Discrete Analyser

(WATER) EK057G: Nitrite as N by Discrete Analyser

(WATER) EK055G: Ammonia as N by Discrete Analyser

(WATER) EK067G: Total Phosphorus as P by Discrete Analyser

(WATER) EK055G-NH4: Ammonium as N by DA

(WATER) EN055: Ionic Balance

(WATER) ED045G: Chloride by Discrete Analyser

(WATER) ED037P: Alkalinity by PC Titrator

(WATER) EK040P: Fluoride by PC Titrator

(WATER) ED041G: Sulfate (Turbidimetric) as SO4 2- by DA

(WATER) ED093T: Total Major Cations



QUALITY CONTROL REPORT

Work Order : **EW2404036**

Page : 1 of 7

Client : **BORAL LIMITED**

Laboratory : Environmental Division NSW South Coast

Contact : Matt Bray

Contact : Aneta Prosaroski

Address : Boral Dunmore Sand and Soil 38 Tabbita Road
DUNMORE 2529

Address : 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia

Telephone : ----

Telephone : 02 42253125

Project : Quarterly Dunmore Sand & Soil Groundwater

Date Samples Received : 30-Aug-2024

Order number : 6896476

Date Analysis Commenced : 30-Aug-2024

C-O-C number : ----

Issue Date : 06-Sep-2024

Sampler : Client - Matt Bray

Site : ----

Quote number : EW24BLUCIR0001

No. of samples received : 18

No. of samples analysed : 18



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Sarah Griffiths	Microbiologist	Sydney Microbiology, Smithfield, NSW

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Laboratory Duplicate (DUP) Report

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
ED037P: Alkalinity by PC Titrator (QC Lot: 6025515)									
EW2404036-005	DG36	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	322	326	1.1	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	322	326	1.1	0% - 20%
ES2428524-002	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	422	422	0.0	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	422	422	0.0	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 6025518)									
EW2404036-017	MW5B3	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	300	300	0.0	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	300	300	0.0	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 6025609)									
EW2404036-010	DG6D	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	1600	1590	0.3	0% - 20%
EW2404036-001	DG17	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1 (10)*	mg/L	<10	<10	0.0	No Limit
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 6025759)									
EN2409908-004	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	1190	1180	0.8	0% - 20%
EW2404015-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	103	103	0.0	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 6025766)									

Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 6025766) - continued									
EW2404036-018	MW5B4	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	3	3	0.0	No Limit
ED045G: Chloride by Discrete Analyser (QC Lot: 6025610)									
EW2404036-010	DG6D	ED045G: Chloride	16887-00-6	1	mg/L	9510	9290	2.3	0% - 20%
EW2404036-001	DG17	ED045G: Chloride	16887-00-6	1	mg/L	449	450	0.3	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 6025758)									
EN2409908-004	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	1740	1740	0.3	0% - 20%
EW2404015-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	2500	2540	1.3	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 6025765)									
EW2404036-018	MW5B4	ED045G: Chloride	16887-00-6	1	mg/L	15	15	0.0	0% - 50%
ED093T: Total Major Cations (QC Lot: 6029188)									
EW2404036-001	DG17	ED093T: Calcium	7440-70-2	1	mg/L	100	101	1.1	0% - 20%
		ED093T: Magnesium	7439-95-4	1	mg/L	117	119	2.0	0% - 20%
		ED093T: Sodium	7440-23-5	1	mg/L	390	395	1.3	0% - 20%
		ED093T: Potassium	7440-09-7	1	mg/L	36	37	0.0	0% - 20%
EW2404036-011	DG7	ED093T: Calcium	7440-70-2	1	mg/L	70	69	0.0	0% - 20%
		ED093T: Magnesium	7439-95-4	1	mg/L	21	21	0.0	0% - 20%
		ED093T: Sodium	7440-23-5	1	mg/L	80	80	0.0	0% - 20%
		ED093T: Potassium	7440-09-7	1	mg/L	2	2	0.0	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 6029187)									
EW2404036-001	DG17	EG020A-T: Iron	7439-89-6	0.05	mg/L	1.98	2.02	2.4	0% - 20%
EW2404036-011	DG7	EG020A-T: Iron	7439-89-6	0.05	mg/L	1.16	1.16	0.0	0% - 20%
EK040P: Fluoride by PC Titrator (QC Lot: 6025517)									
EW2404036-005	DG36	EK040P: Fluoride	16984-48-8	0.1	mg/L	0.6	0.6	0.0	No Limit
ES2428524-002	Anonymous	EK040P: Fluoride	16984-48-8	0.1	mg/L	0.2	0.2	0.0	No Limit
EK040P: Fluoride by PC Titrator (QC Lot: 6025519)									
EW2404036-017	MW5B3	EK040P: Fluoride	16984-48-8	0.1	mg/L	0.2	0.2	0.0	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 6028597)									
ES2428449-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	1.89	1.80	4.7	0% - 20%
ES2428527-003	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.06	0.06	0.0	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 6028600)									
EW2404036-004	DG35	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	1.35	1.49	9.6	0% - 20%
EW2404036-013	MW5A1	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.49	0.60	19.5	0% - 20%
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 6025608)									
EN2409916-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EW2404036-001	DG17	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 6025762)									

Page : 4 of 7
 Work Order : EW2404036
 Client : BORAL LIMITED
 Project : Quarterly Dunmore Sand & Soil Groundwater



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 6025762) - continued									
ES2428364-008	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EW2404015-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	0.09	0.09	0.0	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 6028599)									
EW2404036-004	DG35	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.04	0.04	0.0	No Limit
EW2404036-013	MW5A1	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 6028596)									
EW2404036-009	DG6S	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.5	1.6	0.0	0% - 50%
EW2404036-001	DG17	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.8	1.8	0.0	0% - 50%
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 6028595)									
EW2404036-009	DG6S	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.25	0.23	7.2	0% - 20%
EW2404036-001	DG17	EK067G: Total Phosphorus as P	----	0.01	mg/L	2.84	2.94	3.5	0% - 20%

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
ED037P: Alkalinity by PC Titrator (QCLot: 6025515)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	99.3	81.0	115
				----	50 mg/L	85.6	80.0	120
ED037P: Alkalinity by PC Titrator (QCLot: 6025518)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	99.1	81.0	115
				----	50 mg/L	108	80.0	120
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 6025609)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	101	82.0	122
				<1	500 mg/L	94.0	82.0	122
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 6025759)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	97.3	82.0	122
				<1	500 mg/L	90.1	82.0	122
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 6025766)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	95.9	82.0	122
				<1	500 mg/L	108	82.0	122
ED045G: Chloride by Discrete Analyser (QCLot: 6025610)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	50 mg/L	94.7	80.9	127
				<1	1000 mg/L	96.9	80.9	127
ED045G: Chloride by Discrete Analyser (QCLot: 6025758)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	50 mg/L	93.5	80.9	127
				<1	1000 mg/L	96.5	80.9	127
ED045G: Chloride by Discrete Analyser (QCLot: 6025765)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	50 mg/L	95.2	80.9	127
				<1	1000 mg/L	99.4	80.9	127
ED093T: Total Major Cations (QCLot: 6029188)								
ED093T: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	115	83.0	117
ED093T: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	112	82.0	120
ED093T: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	113	78.0	124
ED093T: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	104	82.0	122
EG020T: Total Metals by ICP-MS (QCLot: 6029187)								
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	97.5	85.0	117
EK040P: Fluoride by PC Titrator (QCLot: 6025517)								



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EK040P: Fluoride by PC Titrator (QCLot: 6025517) - continued								
EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	5 mg/L	99.7	82.0	116
EK040P: Fluoride by PC Titrator (QCLot: 6025519)								
EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	5 mg/L	100	82.0	116
EK055G: Ammonia as N by Discrete Analyser (QCLot: 6028597)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	0.5 mg/L	103	90.0	114
EK055G: Ammonia as N by Discrete Analyser (QCLot: 6028600)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	0.5 mg/L	102	90.0	114
EK057G: Nitrite as N by Discrete Analyser (QCLot: 6025608)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	99.1	82.0	114
EK057G: Nitrite as N by Discrete Analyser (QCLot: 6025762)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	96.8	82.0	114
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 6028599)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	95.0	91.0	113
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 6028596)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	101	69.0	123
				<0.1	5 mg/L	104	70.0	123
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 6028595)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	94.8	71.3	126
				<0.01	0.442 mg/L	108	71.3	126
				<0.01	1 mg/L	103	70.0	130

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 6025609)							
EW2404036-001	DG17	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	100 mg/L	109	70.0	130
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 6025759)							
EN2409908-004	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	# Not Determined	70.0	130
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 6025766)							
EW2404036-018	MW5B4	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	122	70.0	130

Page : 7 of 7
 Work Order : EW2404036
 Client : BORAL LIMITED
 Project : Quarterly Dunmore Sand & Soil Groundwater



Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED045G: Chloride by Discrete Analyser (QCLot: 6025610)							
EW2404036-001	DG17	ED045G: Chloride	16887-00-6	250 mg/L	75.1	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 6025758)							
EN2409908-004	Anonymous	ED045G: Chloride	16887-00-6	250 mg/L	# Not Determined	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 6025765)							
EW2404036-018	MW5B4	ED045G: Chloride	16887-00-6	250 mg/L	119	70.0	130
EK040P: Fluoride by PC Titrator (QCLot: 6025517)							
ES2428524-006	Anonymous	EK040P: Fluoride	16984-48-8	5 mg/L	92.3	70.0	130
EK040P: Fluoride by PC Titrator (QCLot: 6025519)							
EW2404036-018	MW5B4	EK040P: Fluoride	16984-48-8	5 mg/L	92.3	70.0	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 6028597)							
ES2428449-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.5 mg/L	85.6	70.0	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 6028600)							
EW2404036-004	DG35	EK055G: Ammonia as N	7664-41-7	0.5 mg/L	77.2	70.0	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 6025608)							
EW2404036-001	DG17	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	109	70.0	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 6025762)							
ES2428364-008	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	109	70.0	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 6028599)							
EW2404036-004	DG35	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	92.2	70.0	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 6028596)							
EW2404036-002	DG21	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	82.6	70.0	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 6028595)							
EW2404036-002	DG21	EK067G: Total Phosphorus as P	----	1 mg/L	102	70.0	130



QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EW2404036	Page	: 1 of 10
Client	: BORAL LIMITED	Laboratory	: Environmental Division NSW South Coast
Contact	: Matt Bray	Telephone	: 02 42253125
Project	: Quarterly Dunmore Sand & Soil Groundwater	Date Samples Received	: 30-Aug-2024
Site	: ----	Issue Date	: 06-Sep-2024
Sampler	: Client - Matt Bray	No. of samples received	: 18
Order number	: 6896476	No. of samples analysed	: 18

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Duplicate outliers occur.
- **NO** Laboratory Control outliers occur.
- Matrix Spike outliers exist - please see following pages for full details.
- For all regular sample matrices, where applicable to the methodology, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- **NO** Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers exist - please see following pages for full details.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	EN2409908--004	Anonymous	Sulfate as SO4 - Turbidimetric	14808-79-8	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
ED045G: Chloride by Discrete Analyser	EN2409908--004	Anonymous	Chloride	16887-00-6	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

Quality Control Sample Type		Count		Rate (%)		Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	
Laboratory Control Samples (LCS)						
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	18	11.11	15.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)						
Total Metals by ICP-MS - Suite A	EG020A-T	0	19	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P)	29-Aug-2024	----	----	----	30-Aug-2024	12-Sep-2024	✓
DG17,		DG21,					
DG31S,		DG35,					
DG36,		DG1S,					
DG5S,		DG5D,					
DG6S,		DG6D,					
DG7,		DW4,					
MW5A1,		MW5A3,					
MW5B2D,	MW5B2S,						
MW5B3,	MW5B4						



Matrix: WATER

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Clear Plastic Bottle - Natural (ED041G) DG17, DG31S, DG36, DG5S, DG6S, DW4, MW5A3		DG21, DG35, DG1S, DG5D, DG6D, MW5A1,	29-Aug-2024	----	----	----	30-Aug-2024	26-Sep-2024	✓
Clear Plastic Bottle - Natural (ED041G) DG7, MW5B2S, MW5B4		MW5B2D, MW5B3,	29-Aug-2024	----	----	----	31-Aug-2024	26-Sep-2024	✓
ED045G: Chloride by Discrete Analyser									
Clear Plastic Bottle - Natural (ED045G) DG17, DG31S, DG36, DG5S, DG6S, DW4, MW5A3		DG21, DG35, DG1S, DG5D, DG6D, MW5A1,	29-Aug-2024	----	----	----	30-Aug-2024	26-Sep-2024	✓
Clear Plastic Bottle - Natural (ED045G) DG7, MW5B2S, MW5B4		MW5B2D, MW5B3,	29-Aug-2024	----	----	----	31-Aug-2024	26-Sep-2024	✓
ED093T: Total Major Cations									
Clear Plastic Bottle - Nitric Acid; Unfiltered (ED093T) DG17, DG31S, DG36, DG5S, DG6S, DG7, MW5A1, MW5B2D, MW5B3,		DG21, DG35, DG1S, DG5D, DG6D, DW4, MW5A3, MW5B2S, MW5B4	29-Aug-2024	03-Sep-2024	26-Sep-2024	✓	03-Sep-2024	26-Sep-2024	✓



Matrix: WATER

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020T: Total Metals by ICP-MS								
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T)		29-Aug-2024	03-Sep-2024	25-Feb-2025	✔	03-Sep-2024	25-Feb-2025	✔
DG17,	DG21,							
DG31S,	DG35,							
DG36,	DG1S,							
DG5S,	DG5D,							
DG6S,	DG6D,							
DG7,	DW4,							
MW5A1,	MW5A3,							
MW5B2D,	MW5B2S,							
MW5B3,	MW5B4							
EK040P: Fluoride by PC Titrator								
Clear Plastic Bottle - Natural (EK040P)		29-Aug-2024	----	----	----	30-Aug-2024	26-Sep-2024	✔
DG17,	DG21,							
DG31S,	DG35,							
DG36,	DG1S,							
DG5S,	DG5D,							
DG6S,	DG6D,							
DG7,	DW4,							
MW5A1,	MW5A3,							
MW5B2D,	MW5B2S,							
MW5B3,	MW5B4							
EK055G: Ammonia as N by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK055G)		29-Aug-2024	----	----	----	03-Sep-2024	26-Sep-2024	✔
DG17,	DG21,							
DG31S,	DG35,							
DG36,	DG1S,							
DG5S,	DG5D,							
DG6S,	DG6D,							
DG7,	DW4,							
MW5A1,	MW5A3,							
MW5B2D,	MW5B2S,							
MW5B3,	MW5B4							

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EK057G: Nitrite as N by Discrete Analyser								
Clear Plastic Bottle - Natural (EK057G) DG17, DG31S, DG36, DG5S, DG6S, DW4, MW5A3	DG21, DG35, DG1S, DG5D, DG6D, MW5A1,	29-Aug-2024	----	----	----	30-Aug-2024	31-Aug-2024	✓
Clear Plastic Bottle - Natural (EK057G) DG7, MW5B2S, MW5B4	MW5B2D, MW5B3,	29-Aug-2024	----	----	----	31-Aug-2024	31-Aug-2024	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK059G) DG17, DG31S, DG36, DG5S, DG6S, DG7, MW5A1, MW5B2D, MW5B3,	DG21, DG35, DG1S, DG5D, DG6D, DW4, MW5A3, MW5B2S, MW5B4	29-Aug-2024	----	----	----	03-Sep-2024	26-Sep-2024	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK061G) DG17, DG31S, DG36, DG5S, DG6S, DG7, MW5A1, MW5B2D, MW5B3,	DG21, DG35, DG1S, DG5D, DG6D, DW4, MW5A3, MW5B2S, MW5B4	29-Aug-2024	02-Sep-2024	26-Sep-2024	✓	03-Sep-2024	26-Sep-2024	✓

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EK067G: Total Phosphorus as P by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK067G)								
DG17, DG31S, DG36, DG5S, DG6S, DG7, MW5A1, MW5B2D, MW5B3,	DG21, DG35, DG1S, DG5D, DG6D, DW4, MW5A3, MW5B2S, MW5B4	29-Aug-2024	02-Sep-2024	26-Sep-2024	✓	03-Sep-2024	26-Sep-2024	✓
MW006: Faecal Coliforms & E.coli by MF								
Sterile Plastic Bottle - Sodium Thiosulfate (MW006)								
DG17, DG31S, DG36, DG5S, DG6S, DG7, MW5A1, MW5B2D, MW5B3,	DG21, DG35, DG1S, DG5D, DG6D, DW4, MW5A3, MW5B2S, MW5B4	29-Aug-2024	----	----	----	30-Aug-2024	30-Aug-2024	✓
MW023: Enterococci by Membrane Filtration								
Sterile Plastic Bottle - Sodium Thiosulfate (MW023)								
DG17, DG31S, DG36, DG5S, DG6S, DG7, MW5A1, MW5B2D, MW5B3,	DG21, DG35, DG1S, DG5D, DG6D, DW4, MW5A3, MW5B2S, MW5B4	29-Aug-2024	----	----	----	30-Aug-2024	30-Aug-2024	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Alkalinity by Auto Titrator	ED037-P	3	23	13.04	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	4	35	11.43	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	5	34	14.71	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by Auto Titrator	EK040P	3	22	13.64	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Total	ED093T	2	18	11.11	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	18	11.11	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	4	38	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	5	34	14.71	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	18	11.11	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	19	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by Auto Titrator	ED037-P	4	23	17.39	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	2	35	5.71	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	6	34	17.65	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by Auto Titrator	EK040P	2	22	9.09	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Total	ED093T	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	38	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	6	34	17.65	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	18	11.11	15.00	✗	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	3	20	15.00	15.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	2	35	5.71	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	3	34	8.82	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by Auto Titrator	EK040P	2	22	9.09	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Total	ED093T	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	38	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	3	34	8.82	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	2	35	5.71	5.00	✓	NEPM 2013 B3 & ALS QC Standard

Page : 8 of 10
 Work Order : EW2404036
 Client : BORAL LIMITED
 Project : Quarterly Dunmore Sand & Soil Groundwater



Matrix: **WATER**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification .

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Matrix Spikes (MS) - Continued							
Chloride by Discrete Analyser	ED045G	3	34	8.82	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by Auto Titrator	EK040P	2	22	9.09	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	38	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	3	34	8.82	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	0	19	0.00	5.00	✗	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Alkalinity by Auto Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO ₄ 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO ₄ . Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO ₄ suspension is measured by a photometer and the SO ₄ -2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G. The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocyanate forms highly-coloured ferric thiocyanate which is measured at 480 nm.
Major Cations - Total	ED093T	WATER	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Samples are digested by USEPA 3005 prior to analysis. The ICPAES technique ionises the sample atoms emitting a characteristic spectrum. This spectrum is then compared against matrix matched standards for quantification. This method is compliant with NEPM Schedule B(3)
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Fluoride by Auto Titrator	EK040P	WATER	In house: Referenced to APHA 4500-F C: CDTA is added to the sample to provide a uniform ionic strength background, adjust pH, and break up complexes. Fluoride concentration is determined by either manual or automatic ISE measurement. This method is compliant with NEPM Schedule B(3)
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH ₃ G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Ammonium as N	EK055G-NH ₄	WATER	Ammonium in the sample is reported as the ionised / unionised fractions by the use of a nomograph and the initial pH and Temperature. Ammonia is determined by direct colorimetry by Discrete Analyser according to APHA 4500-NH ₃ G. This method is compliant with NEPM Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO ₂ - B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO ₃ - F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined separately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM Schedule B(3)
Nitrite and Nitrate as N (NO _x) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO ₃ - F. Combined oxidised Nitrogen (NO ₂ +NO ₃) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM Schedule B(3)



<i>Analytical Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al, Zhang et al. This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030E. This method is compliant with NEPM Schedule B(3)
Thermotolerant Coliforms & E.coli by Membrane Filtration	MW006	WATER	AS 4276.7
Enumeration of Enterococci by Membrane Filtration	MW023	WATER	AS4276.9
<i>Preparation Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM Schedule B(3)
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM Schedule B(3)



SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **EW2404036**

Client	: BORAL LIMITED	Laboratory	: Environmental Division NSW South Coast
Contact	: Matt Bray	Contact	: Aneta Prosaroski
Address	: Boral Dunmore Sand and Soil 38 Tabbita Road DUNMORE 2529	Address	: 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia
E-mail	: matt.bray@boral.com.au	E-mail	: Aneta.Prosaroski@ALSGlobal.com
Telephone	: ----	Telephone	: 02 42253125
Facsimile	: ----	Facsimile	: W 02 42253128 N 02 44232083
Project	: Quarterly Dunmore Sand & Soil Groundwater	Page	: 1 of 3
Order number	: ----	Quote number	: EW2024BLUCIR0001 (EW24BLUCIR0001)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: Client - Matt Bray		

Dates

Date Samples Received	: 30-Aug-2024 15:17	Issue Date	: 30-Aug-2024
Client Requested Due Date	: 06-Sep-2024	Scheduled Reporting Date	: 06-Sep-2024

Delivery Details

Mode of Delivery	: Client Drop Off	Security Seal	: Not Available
No. of coolers/boxes	: ----	Temperature	: 17.9, 19.3, 16.6 - Ice Bricks present
Receipt Detail	:	No. of samples received / analysed	: 18 / 18

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- **Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.**
- **Please direct any queries you have regarding this work order to the above ALS laboratory contact.**
- **Unless otherwise stated, analytical work for this work order will be conducted at ALS Sydney, NATA accreditation no. 825, site no. 10911.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- No sample container / preservation non-compliance exists.

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - EG020A-T Total Metals by ICPMS - Suite A	WATER - EK055G-NH4 Ammonium as N	WATER - EN055 - PG Ionic Balance by ED037P, ED041G, ED045G & FC & E.coli by MF	WATER - MW023 Enterococci - Enumeration by Membrane	WATER - NT-02A Major Anions (Cl, SO4, Fluoride, Alkalinity)	WATER - NT-08 Total Nitrogen + NO2 + NO3 + NH3 + Total P
EW2404036-001	29-Aug-2024 10:15	DG17	✓	✓	✓	✓	✓	✓
EW2404036-002	29-Aug-2024 11:10	DG21	✓	✓	✓	✓	✓	✓
EW2404036-003	29-Aug-2024 11:00	DG31S	✓	✓	✓	✓	✓	✓
EW2404036-004	29-Aug-2024 10:50	DG35	✓	✓	✓	✓	✓	✓
EW2404036-005	29-Aug-2024 10:40	DG36	✓	✓	✓	✓	✓	✓
EW2404036-006	29-Aug-2024 12:00	DG1S	✓	✓	✓	✓	✓	✓
EW2404036-007	29-Aug-2024 09:00	DG5S	✓	✓	✓	✓	✓	✓
EW2404036-008	29-Aug-2024 09:05	DG5D	✓	✓	✓	✓	✓	✓
EW2404036-009	29-Aug-2024 09:15	DG6S	✓	✓	✓	✓	✓	✓
EW2404036-010	29-Aug-2024 09:20	DG6D	✓	✓	✓	✓	✓	✓
EW2404036-011	29-Aug-2024 13:20	DG7	✓	✓	✓	✓	✓	✓
EW2404036-012	29-Aug-2024 11:50	DW4	✓	✓	✓	✓	✓	✓
EW2404036-013	29-Aug-2024 09:45	MW5A1	✓	✓	✓	✓	✓	✓
EW2404036-014	29-Aug-2024 10:00	MW5A3	✓	✓	✓	✓	✓	✓
EW2404036-015	29-Aug-2024 12:30	MW5B2D	✓	✓	✓	✓	✓	✓
EW2404036-016	29-Aug-2024 12:40	MW5B2S	✓	✓	✓	✓	✓	✓
EW2404036-017	29-Aug-2024 12:50	MW5B3	✓	✓	✓	✓	✓	✓
EW2404036-018	29-Aug-2024 13:00	MW5B4	✓	✓	✓	✓	✓	✓

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - NT-01T Total Major Cations (Ca, Mg, Na, K)
EW2404036-001	29-Aug-2024 10:15	DG17	✓
EW2404036-002	29-Aug-2024 11:10	DG21	✓
EW2404036-003	29-Aug-2024 11:00	DG31S	✓
EW2404036-004	29-Aug-2024 10:50	DG35	✓
EW2404036-005	29-Aug-2024 10:40	DG36	✓
EW2404036-006	29-Aug-2024 12:00	DG1S	✓



			WATER - NT-01T Total Major Cations (Ca, Mg, Na, K)
EW2404036-007	29-Aug-2024 09:00	DG5S	✓
EW2404036-008	29-Aug-2024 09:05	DG5D	✓
EW2404036-009	29-Aug-2024 09:15	DG6S	✓
EW2404036-010	29-Aug-2024 09:20	DG6D	✓
EW2404036-011	29-Aug-2024 13:20	DG7	✓
EW2404036-012	29-Aug-2024 11:50	DW4	✓
EW2404036-013	29-Aug-2024 09:45	MW5A1	✓
EW2404036-014	29-Aug-2024 10:00	MW5A3	✓
EW2404036-015	29-Aug-2024 12:30	MW5B2D	✓
EW2404036-016	29-Aug-2024 12:40	MW5B2S	✓
EW2404036-017	29-Aug-2024 12:50	MW5B3	✓
EW2404036-018	29-Aug-2024 13:00	MW5B4	✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

ACCOUNTS INVOICES

- A4 - AU Tax Invoice (INV)

Email einvoice@boral.com.au

Matt Bray

- *AU Certificate of Analysis - NATA (COA)
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)
- A4 - AU Tax Invoice (INV)
- Chain of Custody (CoC) (COC)
- EDI Format - XTab (XTAB)

Email matt.bray@boral.com.au
Email matt.bray@boral.com.au
Email matt.bray@boral.com.au
Email matt.bray@boral.com.au
Email matt.bray@boral.com.au
Email matt.bray@boral.com.au
Email matt.bray@boral.com.au

Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry / Biology).

(WATER) EG020T: Total Metals by ICP-MS
(WATER) EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser
(WATER) EK061G: Total Kjeldahl Nitrogen By Discrete Analyser
(WATER) EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser
(WATER) EK058G: Nitrate as N by Discrete Analyser
(WATER) EK057G: Nitrite as N by Discrete Analyser
(WATER) EK055G: Ammonia as N by Discrete Analyser
(WATER) EK067G: Total Phosphorus as P by Discrete Analyser
(WATER) EK055G-NH4: Ammonium as N by DA
(WATER) EN055: Ionic Balance
(WATER) ED045G: Chloride by Discrete Analyser
(WATER) ED037P: Alkalinity by PC Titrator
(WATER) EK040P: Fluoride by PC Titrator
(WATER) ED041G: Sulfate (Turbidimetric) as SO4 2- by DA
(WATER) ED093T: Total Major Cations
(WATER) MW023: Enterococci by Membrane Filtration
(WATER) MW006: Faecal Coliforms & E.coli by MF

Environmental Division
Wollongong
Work Order Reference
EW2404036



Telephone : 02 42253125



CERTIFICATE OF ANALYSIS

Work Order : **EW2405344**

Amendment : **1**

Client : **BORAL LIMITED**

Contact : Matt Bray

Address : Boral Dunmore Sand and Soil 38 Tabbita Road
DUNMORE 2529

Telephone : ----

Project : Quarterly Dunmore Sand & Soil Groundwater

Order number : 6930208

C-O-C number : ----

Sampler : Client - Matt Bray

Site : ----

Quote number : EW24BLUCIR0001

No. of samples received : 18

No. of samples analysed : 18

Page : 1 of 11

Laboratory : Environmental Division NSW South Coast

Contact : Aneta Prosaroski

Address : 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia

Telephone : 02 42253125

Date Samples Received : 19-Nov-2024 14:26

Date Analysis Commenced : 19-Nov-2024

Issue Date : 16-Jul-2025 10:09



Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Sarah Griffiths	Microbiologist	Sydney Microbiology, Smithfield, NSW



General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- MF = membrane filtration
- CFU = colony forming unit
- Microbiological Comment: In accordance with ALS work instruction QWI-MIC/04, membrane filtration result is reported an approximate (~) when the count of colonies on the filtered membrane is outside the range of 10 - 100cfu.
- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO2 and Fluoride to the Anions.
- MW006 is ALS's internal code and is equivalent to AS4276.5.
- MW023 is ALS's internal code and is equivalent to AS4276.9.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	DG17	DG21	DG31S	DG35	DG36
Sampling date / time				19-Nov-2024 08:15	19-Nov-2024 09:00	19-Nov-2024 09:15	19-Nov-2024 08:30	19-Nov-2024 08:40	
Compound	CAS Number	LOR	Unit	EW2405344-001	EW2405344-002	EW2405344-003	EW2405344-004	EW2405344-005	
				Result	Result	Result	Result	Result	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	796	217	170	392	314	
Total Alkalinity as CaCO3	----	1	mg/L	796	217	170	392	314	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	42	312	36	116	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	470	170	51	66	55	
ED093T: Total Major Cations									
Calcium	7440-70-2	1	mg/L	85	33	131	81	63	
Magnesium	7439-95-4	1	mg/L	101	21	34	37	32	
Sodium	7440-23-5	1	mg/L	334	150	61	93	111	
Potassium	7440-09-7	1	mg/L	34	2	4	15	8	
EG020T: Total Metals by ICP-MS									
Iron	7439-89-6	0.05	mg/L	2.89	0.87	1.48	2.62	27.5	
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	0.7	0.2	0.1	0.6	0.2	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	1.19	0.49	0.35	0.10	0.85	
EK055G-NH4: Ammonium as N by DA									
Ammonium as N	14798-03-9_N	0.01	mg/L	1.10	0.49	0.35	0.10	0.85	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	0.02	<0.01	<0.01	<0.01	0.28	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	0.02	<0.01	<0.01	<0.01	0.28	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	DG17	DG21	DG31S	DG35	DG36
Sampling date / time					19-Nov-2024 08:15	19-Nov-2024 09:00	19-Nov-2024 09:15	19-Nov-2024 08:30	19-Nov-2024 08:40
Compound	CAS Number	LOR	Unit		EW2405344-001	EW2405344-002	EW2405344-003	EW2405344-004	EW2405344-005
					Result	Result	Result	Result	Result
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser - Continued									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		1.7	1.3	0.7	0.2	1.7
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		1.7	1.3	0.7	0.2	2.0
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		2.91	0.37	0.06	0.26	1.04
EN055: Ionic Balance									
ø Total Anions	----	0.01	meq/L		29.2	10.0	11.3	10.4	10.2
ø Total Cations	----	0.01	meq/L		26.7	8.71	10.6	10.2	9.40
ø Ionic Balance	----	0.01	%		4.46	6.89	3.17	1.02	4.28
MW006: Faecal Coliforms & E.coli by MF									
Thermotolerant Coliforms	----	1	CFU/100mL		<1	<1	<1	<1	<1
<i>Escherichia coli</i>	----	1	CFU/100mL		<1	<1	<1	<1	<1
MW023: Enterococci by Membrane Filtration									
<i>Enterococci</i>	----	1	CFU/100mL		<1	~1	<1	<1	<1

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	DG1S	DG5S	DG5D	DG6S	DG6D
Sampling date / time				19-Nov-2024 10:15	19-Nov-2024 10:50	19-Nov-2024 11:00	19-Nov-2024 11:30	19-Nov-2024 11:40	
Compound	CAS Number	LOR	Unit	EW2405344-006	EW2405344-007	EW2405344-008	EW2405344-009	EW2405344-010	
				Result	Result	Result	Result	Result	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	197	352	250	347	397	
Total Alkalinity as CaCO3	----	1	mg/L	197	352	250	347	397	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	780	141	715	1450	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	47	7000	101	6180	9800	
ED093T: Total Major Cations									
Calcium	7440-70-2	1	mg/L	60	352	135	187	409	
Magnesium	7439-95-4	1	mg/L	10	500	22	426	745	
Sodium	7440-23-5	1	mg/L	43	3880	63	3420	5900	
Potassium	7440-09-7	1	mg/L	2	117	4	129	194	
EG020T: Total Metals by ICP-MS									
Iron	7439-89-6	0.05	mg/L	2.27	3.72	3.20	5.36	21.2	
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	0.2	0.6	0.3	0.6	0.3	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.90	2.93	0.42	0.52	0.86	
EK055G-NH4: Ammonium as N by DA									
Ammonium as N	14798-03-9_N	0.01	mg/L	0.89	2.88	0.42	0.52	0.86	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	DG1S	DG5S	DG5D	DG6S	DG6D
Sampling date / time					19-Nov-2024 10:15	19-Nov-2024 10:50	19-Nov-2024 11:00	19-Nov-2024 11:30	19-Nov-2024 11:40
Compound	CAS Number	LOR	Unit		EW2405344-006	EW2405344-007	EW2405344-008	EW2405344-009	EW2405344-010
					Result	Result	Result	Result	Result
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser - Continued									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		1.3	4.7	0.8	1.5	1.6
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		1.3	4.7	0.8	1.5	1.6
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		0.23	0.60	0.21	0.25	0.58
EN055: Ionic Balance									
∅ Total Anions	----	0.01	meq/L		5.26	221	10.8	196	314
∅ Total Cations	----	0.01	meq/L		5.03	216	9.58	181	310
∅ Ionic Balance	----	0.01	%		2.29	1.20	5.90	3.95	0.67
MW006: Faecal Coliforms & E.coli by MF									
Thermotolerant Coliforms	----	1	CFU/100mL		~3	<1	~7	~2	<1
<i>Escherichia coli</i>	----	1	CFU/100mL		~3	<1	~7	~2	<1
MW023: Enterococci by Membrane Filtration									
<i>Enterococci</i>	----	1	CFU/100mL		<1	<1	~5	<1	<1

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	DG7	GW4	MW5A1	MW5A3	MW5B2D
Sampling date / time				19-Nov-2024 08:30	19-Nov-2024 09:40	19-Nov-2024 12:00	19-Nov-2024 12:10	19-Nov-2024 12:30	
Compound	CAS Number	LOR	Unit	EW2405344-011	EW2405344-012	EW2405344-013	EW2405344-014	EW2405344-015	
				Result	Result	Result	Result	Result	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	241	194	246	46	283	
Total Alkalinity as CaCO3	----	1	mg/L	241	194	246	46	283	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	35	12	28	10	19	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	47	209	89	69	60	
ED093T: Total Major Cations									
Calcium	7440-70-2	1	mg/L	57	71	78	5	99	
Magnesium	7439-95-4	1	mg/L	17	18	20	2	15	
Sodium	7440-23-5	1	mg/L	72	112	58	43	48	
Potassium	7440-09-7	1	mg/L	2	1	6	2	6	
EG020T: Total Metals by ICP-MS									
Iron	7439-89-6	0.05	mg/L	1.06	0.20	4.31	1.28	3.84	
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	0.5	0.2	0.1	0.1	0.2	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.99	0.02	0.38	0.30	0.63	
EK055G-NH4: Ammonium as N by DA									
Ammonium as N	14798-03-9_N	0.01	mg/L	0.99	0.02	0.37	0.30	0.63	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	0.02	<0.01	0.01	<0.01	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.02	<0.01	0.01	<0.01	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	DG7	GW4	MW5A1	MW5A3	MW5B2D
Sampling date / time					19-Nov-2024 08:30	19-Nov-2024 09:40	19-Nov-2024 12:00	19-Nov-2024 12:10	19-Nov-2024 12:30
Compound	CAS Number	LOR	Unit		EW2405344-011	EW2405344-012	EW2405344-013	EW2405344-014	EW2405344-015
					Result	Result	Result	Result	Result
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser - Continued									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		1.2	<0.1	1.2	0.9	1.0
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		1.2	<0.1	1.2	0.9	1.0
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		0.22	0.05	0.21	0.14	0.13
EN055: Ionic Balance									
∅ Total Anions	----	0.01	meq/L		6.87	10.0	8.01	3.07	7.74
∅ Total Cations	----	0.01	meq/L		----	9.92	8.21	----	----
∅ Total Cations	----	0.01	meq/L		6.77	----	----	3.11	7.22
∅ Ionic Balance	----	0.01	%		----	0.52	1.24	----	----
∅ Ionic Balance	----	0.01	%		0.72	----	----	0.57	3.51
MW006: Faecal Coliforms & E.coli by MF									
Thermotolerant Coliforms	----	1	CFU/100mL		<1	~9	~2	~2	<1
<i>Escherichia coli</i>	----	1	CFU/100mL		<1	~9	~1	~1	<1
MW023: Enterococci by Membrane Filtration									
<i>Enterococci</i>	----	1	CFU/100mL		<1	<1	~1	~1	<1



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MW5B2S	MW5B3	MW5B4	----	----
Sampling date / time					19-Nov-2024 12:20	19-Nov-2024 12:40	19-Nov-2024 12:50	----	----
Compound	CAS Number	LOR	Unit		EW2405344-016	EW2405344-017	EW2405344-018	-----	-----
					Result	Result	Result	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser - Continued									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		1.2	0.7	1.5	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		1.2	0.7	1.5	----	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		0.18	0.11	0.67	----	----
EN055: Ionic Balance									
ø Total Anions	----	0.01	meq/L		8.45	5.71	5.01	----	----
ø Total Cations	----	0.01	meq/L		8.11	5.40	4.66	----	----
ø Ionic Balance	----	0.01	%		2.05	2.76	3.62	----	----
MW006: Faecal Coliforms & E.coli by MF									
Thermotolerant Coliforms	----	1	CFU/100mL		~1	<1	<1	----	----
Escherichia coli	----	1	CFU/100mL		~1	<1	<1	----	----
MW023: Enterococci by Membrane Filtration									
Enterococci	----	1	CFU/100mL		~3	<1	16	----	----



Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry / Biology).

(WATER) ED093T: Total Major Cations

(WATER) MW023: Enterococci by Membrane Filtration

(WATER) EG020T: Total Metals by ICP-MS

(WATER) MW006: Faecal Coliforms & E.coli by MF

(WATER) EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser

(WATER) EK061G: Total Kjeldahl Nitrogen By Discrete Analyser

(WATER) EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser

(WATER) EK058G: Nitrate as N by Discrete Analyser

(WATER) EK057G: Nitrite as N by Discrete Analyser

(WATER) EK055G: Ammonia as N by Discrete Analyser

(WATER) EK067G: Total Phosphorus as P by Discrete Analyser

(WATER) EK055G-NH4: Ammonium as N by DA

(WATER) EN055: Ionic Balance

(WATER) ED045G: Chloride by Discrete Analyser

(WATER) ED037P: Alkalinity by PC Titrator

(WATER) EK040P: Fluoride by PC Titrator

(WATER) ED041G: Sulfate (Turbidimetric) as SO4 2- by DA



QUALITY CONTROL REPORT

Work Order : **EW2405344**

Page : 1 of 8

Amendment : **1**

Client : **BORAL LIMITED**

Contact : Matt Bray

Address : Boral Dunmore Sand and Soil 38 Tabbita Road
DUNMORE 2529

Telephone : ----

Project : Quarterly Dunmore Sand & Soil Groundwater

Order number : 6930208

C-O-C number : ----

Sampler : Client - Matt Bray

Site : ----

Quote number : EW24BLUCIR0001

No. of samples received : 18

No. of samples analysed : 18

Laboratory : Environmental Division NSW South Coast

Contact : Aneta Prosaroski

Address : 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia

Telephone : 02 42253125

Date Samples Received : 19-Nov-2024

Date Analysis Commenced : 19-Nov-2024

Issue Date : 16-Jul-2025



Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Sarah Griffiths	Microbiologist	Sydney Microbiology, Smithfield, NSW



General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot

CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

RPD = Relative Percentage Difference

= Indicates failed QC

* = The final LOR has been raised due to dilution or other sample specific cause; adjusted LOR is shown in brackets. The duplicate ranges for Acceptable RPD% are applied to the final LOR where applicable.

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
ED037P: Alkalinity by PC Titrator (QC Lot: 6212757)									
EW2405344-001	DG17	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	796	799	0.4	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	796	799	0.4	0% - 20%
EW2405344-010	DG6D	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	397	397	0.0	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	397	397	0.0	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 6199728)									
ES2437644-013	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	70	68	1.5	0% - 20%
EW2405344-005	DG36	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	116	111	4.0	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 6202881)									
ES2437828-003	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	<1	0.0	No Limit
ED2400139-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1 (100)*	mg/L	<100	<100	0.0	No Limit
ED045G: Chloride by Discrete Analyser (QC Lot: 6199730)									
EW2405344-007	DG5S	ED045G: Chloride	16887-00-6	1	mg/L	7000	7040	0.6	0% - 20%
ES2437644-015	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	61	59	3.1	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 6202882)									
ES2437828-002	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	58	62	7.8	0% - 20%
ED2400139-001	Anonymous	ED045G: Chloride	16887-00-6	1 (100)*	mg/L	2810	2850	1.2	0% - 20%

Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
ED045G: Chloride by Discrete Analyser (QC Lot: 6202886)									
EW2405344-018	MW5B4	ED045G: Chloride	16887-00-6	1	mg/L	19	19	0.0	0% - 50%
ED093T: Total Major Cations (QC Lot: 6209765)									
EW2405344-001	DG17	ED093T: Calcium	7440-70-2	1	mg/L	85	90	4.8	0% - 20%
		ED093T: Magnesium	7439-95-4	1	mg/L	101	107	5.8	0% - 20%
		ED093T: Sodium	7440-23-5	1	mg/L	334	347	3.8	0% - 20%
		ED093T: Potassium	7440-09-7	1	mg/L	34	36	5.5	0% - 20%
EW2405344-016	MW5B2S	ED093T: Calcium	7440-70-2	1	mg/L	131	131	0.0	0% - 20%
		ED093T: Magnesium	7439-95-4	1	mg/L	12	12	0.0	0% - 50%
		ED093T: Sodium	7440-23-5	1	mg/L	44	43	0.0	0% - 20%
		ED093T: Potassium	7440-09-7	1	mg/L	4	4	0.0	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 6209762)									
EW2405344-001	DG17	EG020A-T: Iron	7439-89-6	0.05	mg/L	2.89	3.19	10.0	0% - 20%
ES2438110-001	Anonymous	EG020A-T: Iron	7439-89-6	0.05	mg/L	0.30	0.34	12.3	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 6209766)									
EW2405344-006	DG1S	EG020A-T: Iron	7439-89-6	0.05	mg/L	2.27	2.27	0.0	0% - 20%
EW2405344-016	MW5B2S	EG020A-T: Iron	7439-89-6	0.05	mg/L	3.89	3.86	0.8	0% - 20%
EK040P: Fluoride by PC Titrator (QC Lot: 6212756)									
EW2405344-001	DG17	EK040P: Fluoride	16984-48-8	0.1	mg/L	0.7	0.7	0.0	No Limit
EW2405344-010	DG6D	EK040P: Fluoride	16984-48-8	0.1	mg/L	0.3	0.3	0.0	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 6213473)									
ES2437701-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.07	0.04	65.4	No Limit
EW2405344-004	DG35	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.10	0.09	15.1	0% - 50%
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 6213476)									
EW2405344-015	MW5B2D	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.63	0.53	16.2	0% - 20%
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 6199727)									
ES2437644-013	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EW2405344-005	DG36	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 6202885)									
EW2405342-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
ES2437828-007	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 6213474)									
ES2437701-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.66	0.65	1.9	0% - 20%
EW2405344-004	DG35	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 6213475)									
EW2405344-015	MW5B2D	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 6213470)									



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 6213470) - continued									
ES2437701-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.4	0.4	0.0	No Limit
EW2405344-005	DG36	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.7	1.6	0.0	0% - 50%
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 6213472)									
EW2405344-015	MW5B2D	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.0	1.0	0.0	0% - 50%
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 6213469)									
ES2437701-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.08	0.08	0.0	No Limit
EW2405344-005	DG36	EK067G: Total Phosphorus as P	----	0.01	mg/L	1.04	1.03	0.0	0% - 20%
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 6213471)									
EW2405344-015	MW5B2D	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.13	0.14	0.0	0% - 50%



Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
ED037P: Alkalinity by PC Titrator (QCLot: 6212757)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	90.9	81.0	115
				----	50 mg/L	94.2	80.0	128
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 6199728)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	105	82.0	122
				<1	500 mg/L	99.8	82.0	122
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 6202881)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	108	82.0	122
				<1	500 mg/L	94.1	82.0	122
ED045G: Chloride by Discrete Analyser (QCLot: 6199730)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	50 mg/L	103	80.9	127
				<1	1000 mg/L	104	80.9	127
ED045G: Chloride by Discrete Analyser (QCLot: 6202882)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	50 mg/L	101	80.9	127
				<1	1000 mg/L	94.9	80.9	127
ED045G: Chloride by Discrete Analyser (QCLot: 6202886)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	50 mg/L	102	80.9	127
				<1	1000 mg/L	103	80.9	127
ED093T: Total Major Cations (QCLot: 6209765)								
ED093T: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	102	83.0	117
ED093T: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	107	82.0	120
ED093T: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	104	78.0	124
ED093T: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	103	82.0	122
EG020T: Total Metals by ICP-MS (QCLot: 6209762)								
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	110	85.0	117
EG020T: Total Metals by ICP-MS (QCLot: 6209766)								
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	98.3	85.0	117
EK040P: Fluoride by PC Titrator (QCLot: 6212756)								
EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	5 mg/L	94.0	82.0	116
EK055G: Ammonia as N by Discrete Analyser (QCLot: 6213473)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	0.5 mg/L	109	90.0	114



Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result			Low	High
EK055G: Ammonia as N by Discrete Analyser (QCLot: 6213476)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	0.5 mg/L	108	90.0	114
EK057G: Nitrite as N by Discrete Analyser (QCLot: 6199727)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	103	82.0	114
EK057G: Nitrite as N by Discrete Analyser (QCLot: 6202885)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	104	82.0	114
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 6213474)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	105	91.0	113
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 6213475)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	104	91.0	113
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 6213470)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	96.8	69.0	123
				<0.1	1 mg/L	95.0	70.0	123
				<0.1	5 mg/L	100	70.0	123
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 6213472)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	97.5	69.0	123
				<0.1	1 mg/L	96.7	70.0	123
				<0.1	5 mg/L	97.2	70.0	123
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 6213469)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	96.2	71.3	126
				<0.01	0.442 mg/L	98.0	71.3	126
				<0.01	1 mg/L	101	70.0	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 6213471)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	95.7	71.3	126
				<0.01	0.442 mg/L	96.7	71.3	126
				<0.01	1 mg/L	95.4	70.0	130

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 6199728)							
ES2437644-013	Anonymous						



Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike Concentration	SpikeRecovery(%) MS	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number			Low	High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 6199728) - continued							
ES2437644-013	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	# Not Determined	70.0	130
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 6202881)							
ED2400139-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1000 mg/L	123	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 6199730)							
ES2437644-015	Anonymous	ED045G: Chloride	16887-00-6	250 mg/L	104	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 6202882)							
ED2400139-001	Anonymous	ED045G: Chloride	16887-00-6	250 mg/L	# Not Determined	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 6202886)							
EW2405344-018	MW5B4	ED045G: Chloride	16887-00-6	250 mg/L	102	70.0	130
EK040P: Fluoride by PC Titrator (QCLot: 6212756)							
EW2405344-002	DG21	EK040P: Fluoride	16984-48-8	5 mg/L	89.1	70.0	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 6213473)							
ES2437701-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.5 mg/L	105	70.0	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 6213476)							
EW2405344-015	MW5B2D	EK055G: Ammonia as N	7664-41-7	0.5 mg/L	113	70.0	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 6199727)							
ES2437644-013	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	125	70.0	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 6202885)							
ES2437828-007	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	114	70.0	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 6213474)							
ES2437701-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	101	70.0	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 6213475)							
EW2405344-015	MW5B2D	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	106	70.0	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 6213470)							
ES2437701-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	102	70.0	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 6213472)							
EW2405344-016	MW5B2S	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	100	70.0	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 6213469)							
ES2437701-002	Anonymous	EK067G: Total Phosphorus as P	----	1 mg/L	101	70.0	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 6213471)							
EW2405344-016	MW5B2S	EK067G: Total Phosphorus as P	----	1 mg/L	95.0	70.0	130





QA/QC Compliance Assessment to assist with Quality Review

Work Order : EW2405344

Page : 1 of 10

Amendment : 1

Client : BORAL LIMITED

Contact : Matt Bray

Project : Quarterly Dunmore Sand & Soil Groundwater

Site : ----

Sampler : Client - Matt Bray

Order number : 6930208

Laboratory : Environmental Division NSW South Coast

Telephone : 02 42253125

Date Samples Received : 19-Nov-2024

Issue Date : 16-Jul-2025

No. of samples received : 18

No. of samples analysed : 18

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Duplicate outliers occur.
- **NO** Laboratory Control outliers occur.
- Matrix Spike outliers exist - please see following pages for full details.
- For all regular sample matrices, where applicable to the methodology, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- **NO** Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers exist - please see following pages for full details.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	ES2437644--013	Anonymous	Sulfate as SO4 - Turbidimetric	14808-79-8	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
ED045G: Chloride by Discrete Analyser	ED2400139--001	Anonymous	Chloride	16887-00-6	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

Quality Control Sample Type		Count		Rate (%)		Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	
Matrix Spikes (MS)						
Total Metals by ICP-MS - Suite A	EG020A-T	0	32	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Evaluation: ✖ = Holding time breach : ✔ = Within holding time

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED037P: Alkalinity by PC Titrator								
Clear Plastic Bottle - Natural (ED037-P)		19-Nov-2024	----	----	----	25-Nov-2024	03-Dec-2024	✓
DG17,	DG21,							
DG31S,	DG35,							
DG36,	DG1S,							
DG5S,	DG5D,							
DG6S,	DG6D,							
DG7,	GW4,							
MW5A1,	MW5A3,							
MW5B2D,	MW5B2S,							
MW5B3,	MW5B4							

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Clear Plastic Bottle - Natural (ED041G) DG17, MW5B2S	DG1S,	19-Nov-2024	----	----	----	20-Nov-2024	17-Dec-2024	✓
Clear Plastic Bottle - Natural (ED041G) DG21, DG35, DG5S, DG6S, DG7, MW5A1, MW5B2D, MW5B4	DG31S, DG36, DG5D, DG6D, GW4, MW5A3, MW5B3, MW5B4	19-Nov-2024	----	----	----	21-Nov-2024	17-Dec-2024	✓
ED045G: Chloride by Discrete Analyser								
Clear Plastic Bottle - Natural (ED045G) DG17, DG31S, DG36, DG5S, DG6S, DG7, MW5A1, MW5B2D, MW5B3,	DG21, DG35, DG1S, DG5D, DG6D, GW4, MW5A3, MW5B2S, MW5B4	19-Nov-2024	----	----	----	21-Nov-2024	17-Dec-2024	✓
ED093T: Total Major Cations								
Clear Plastic Bottle - Nitric Acid; Unfiltered (ED093T) DG17, DG31S, DG36, DG5S, DG6S, DG7, MW5A1, MW5B2D, MW5B3,	DG21, DG35, DG1S, DG5D, DG6D, GW4, MW5A3, MW5B2S, MW5B4	19-Nov-2024	25-Nov-2024	17-Dec-2024	✓	25-Nov-2024	17-Dec-2024	✓

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EG020T: Total Metals by ICP-MS									
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T)	DG17, DG31S, DG36, DG5S, DG6S, DG7, MW5A1, MW5B2D, MW5B3,	DG21, DG35, DG1S, DG5D, DG6D, GW4, MW5A3, MW5B2S, MW5B4	19-Nov-2024	25-Nov-2024	18-May-2025	✓	25-Nov-2024	18-May-2025	✓
EK040P: Fluoride by PC Titrator									
Clear Plastic Bottle - Natural (EK040P)	DG17, DG31S, DG36, DG5S, DG6S, DG7, MW5A1, MW5B2D, MW5B3,	DG21, DG35, DG1S, DG5D, DG6D, GW4, MW5A3, MW5B2S, MW5B4	19-Nov-2024	----	----	----	25-Nov-2024	17-Dec-2024	✓
EK055G: Ammonia as N by Discrete Analyser									
Clear Plastic Bottle - Sulfuric Acid (EK055G)	DG17, DG31S, DG36, DG5S, DG6S, DG7, MW5A1, MW5B2D, MW5B3,	DG21, DG35, DG1S, DG5D, DG6D, GW4, MW5A3, MW5B2S, MW5B4	19-Nov-2024	----	----	----	26-Nov-2024	17-Dec-2024	✓



Matrix: WATER		Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.						
Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK057G: Nitrite as N by Discrete Analyser								
Clear Plastic Bottle - Natural (EK057G) DG6D		19-Nov-2024	----	----	----	20-Nov-2024	21-Nov-2024	✔
Clear Plastic Bottle - Natural (EK057G) DG17, DG21, DG31S, DG35, DG36, DG1S, DG5S, DG5D, DG6S, DG7, GW4, MW5A1, MW5A3, MW5B2D, MW5B2S, MW5B3, MW5B4		19-Nov-2024	----	----	----	21-Nov-2024	21-Nov-2024	✔
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK059G) DG17, DG21, DG31S, DG35, DG36, DG1S, DG5S, DG5D, DG6S, DG6D, DG7, GW4, MW5A1, MW5A3, MW5B2D, MW5B2S, MW5B3, MW5B4		19-Nov-2024	----	----	----	26-Nov-2024	17-Dec-2024	✔
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK061G) DG17, DG21, DG31S, DG35, DG36, DG1S, DG5S, DG5D, DG6S, DG6D, DG7, GW4, MW5A1, MW5A3, MW5B2D, MW5B2S, MW5B3, MW5B4		19-Nov-2024	26-Nov-2024	17-Dec-2024	✔	26-Nov-2024	17-Dec-2024	✔



Matrix: WATER

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK067G: Total Phosphorus as P by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK067G)		19-Nov-2024	26-Nov-2024	17-Dec-2024	✔	26-Nov-2024	17-Dec-2024	✔
DG17,	DG21,							
DG31S,	DG35,							
DG36,	DG1S,							
DG5S,	DG5D,							
DG6S,	DG6D,							
DG7,	GW4,							
MW5A1,	MW5A3,							
MW5B2D,	MW5B2S,							
MW5B3,	MW5B4							
MW006: Faecal Coliforms & E.coli by MF								
Sterile Plastic Bottle - Sodium Thiosulfate (MW006)		19-Nov-2024	----	----	----	19-Nov-2024	20-Nov-2024	✔
DG17,	DG21,							
DG31S,	DG35,							
DG36,	DG1S,							
DG5S,	DG5D,							
DG6S,	DG6D,							
DG7,	GW4,							
MW5A1,	MW5A3,							
MW5B2D,	MW5B2S,							
MW5B3,	MW5B4							
MW023: Enterococci by Membrane Filtration								
Sterile Plastic Bottle - Sodium Thiosulfate (MW023)		19-Nov-2024	----	----	----	19-Nov-2024	20-Nov-2024	✔
DG17,	DG21,							
DG31S,	DG35,							
DG36,	DG1S,							
DG5S,	DG5D,							
DG6S,	DG6D,							
DG7,	GW4,							
MW5A1,	MW5A3,							
MW5B2D,	MW5B2S,							
MW5B3,	MW5B4							



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)		Quality Control Specification	
Analytical Methods	Method	QC	Regular	Actual	Expected		Evaluation
Laboratory Duplicates (DUP)							
Alkalinity by Auto Titrator	ED037-P	2	18	11.11	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	3	24	12.50	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	5	39	12.82	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by Auto Titrator	EK040P	2	18	11.11	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Total	ED093T	2	18	11.11	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	3	24	12.50	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	4	36	11.11	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	4	40	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	3	25	12.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	4	32	12.50	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	3	30	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by Auto Titrator	ED037-P	2	18	11.11	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	2	24	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	6	39	15.38	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by Auto Titrator	EK040P	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Total	ED093T	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	24	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	36	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	4	40	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	6	25	24.00	15.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	32	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	6	30	20.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	2	24	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	3	39	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by Auto Titrator	EK040P	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Total	ED093T	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	24	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	36	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	25	8.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	32	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	30	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	2	24	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Matrix: **WATER**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification .

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Matrix Spikes (MS) - Continued							
Chloride by Discrete Analyser	ED045G	3	39	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by Auto Titrator	EK040P	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	24	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	36	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	25	8.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	0	32	0.00	5.00	✗	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	30	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Alkalinity by Auto Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO ₄ 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO ₄ . Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO ₄ suspension is measured by a photometer and the SO ₄ -2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G. The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocyanate forms highly-coloured ferric thiocyanate which is measured at 480 nm.
Major Cations - Total	ED093T	WATER	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Samples are digested by USEPA 3005 prior to analysis. The ICPAES technique ionises the sample atoms emitting a characteristic spectrum. This spectrum is then compared against matrix matched standards for quantification. This method is compliant with NEPM Schedule B(3)
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Fluoride by Auto Titrator	EK040P	WATER	In house: Referenced to APHA 4500-F C: CDTA is added to the sample to provide a uniform ionic strength background, adjust pH, and break up complexes. Fluoride concentration is determined by either manual or automatic ISE measurement. This method is compliant with NEPM Schedule B(3)
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH ₃ G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Ammonium as N	EK055G-NH ₄	WATER	Ammonium in the sample is reported as the ionised / unionised fractions by the use of a nomograph and the initial pH and Temperature. Ammonia is determined by direct colorimetry by Discrete Analyser according to APHA 4500-NH ₃ G. This method is compliant with NEPM Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO ₂ - B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO ₃ - F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined separately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM Schedule B(3)
Nitrite and Nitrate as N (NO _x) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO ₃ - F. Combined oxidised Nitrogen (NO ₂ +NO ₃) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM Schedule B(3)



<i>Analytical Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al, Zhang et al. This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030E. This method is compliant with NEPM Schedule B(3)
Thermotolerant Coliforms & E.coli by Membrane Filtration	MW006	WATER	AS 4276.5
Enumeration of Enterococci by Membrane Filtration	MW023	WATER	AS4276.9
<i>Preparation Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM Schedule B(3)
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM Schedule B(3)



CERTIFICATE OF ANALYSIS

Work Order	: EW2500898	Page	: 1 of 10
Client	: BORAL LIMITED	Laboratory	: Environmental Division NSW South Coast
Contact	: Keira Leahy	Contact	: Aneta Prosaroski
Address	: Boral Dunmore Sand and Soil 38 Tabbita Road DUNMORE 2529	Address	: 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia
Telephone	: ----	Telephone	: 02 42253125
Project	: Quarterly Dunmore Sand & Soil Groundwater	Date Samples Received	: 18-Feb-2025 13:59
Order number	: 6969841	Date Analysis Commenced	: 18-Feb-2025
C-O-C number	: ----	Issue Date	: 27-Feb-2025 17:10
Sampler	: Client, Keira Leahy		
Site	: ----		
Quote number	: EW24BLUCIR0001		
No. of samples received	: 18		
No. of samples analysed	: 18		



Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Prasanna Ganta	Team Leader - Microbiology/Phycology	Sydney Microbiology, Smithfield, NSW



General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- MF = membrane filtration
- CFU = colony forming unit
- Microbiological Comment: In accordance with ALS work instruction QWI-MIC/04, membrane filtration result is reported an approximate (~) when the count of colonies on the filtered membrane is outside the range of 10 - 100cfu.
- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO2 and Fluoride to the Anions.
- MW006 is ALS's internal code and is equivalent to AS4276.5.
- MW023 is ALS's internal code and is equivalent to AS4276.9.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	DG17	DG21	DG31S	DG35	DG36
Sampling date / time				18-Feb-2025 08:05	18-Feb-2025 08:55	18-Feb-2025 00:45	18-Feb-2025 08:35	18-Feb-2025 08:20	
Compound	CAS Number	LOR	Unit	EW2500898-001	EW2500898-002	EW2500898-003	EW2500898-004	EW2500898-005	
				Result	Result	Result	Result	Result	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	802	133	169	339	503	
Total Alkalinity as CaCO3	----	1	mg/L	802	133	169	339	503	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	89	200	102	144	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	381	206	34	50	62	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	88	21	99	60	100	
Magnesium	7439-95-4	1	mg/L	94	14	19	32	46	
Sodium	7440-23-5	1	mg/L	303	171	44	109	80	
Potassium	7440-09-7	1	mg/L	32	2	3	8	16	
EG020F: Dissolved Metals by ICP-MS									
Iron	7439-89-6	0.05	mg/L	1.03	0.85	1.11	29.2	2.64	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.92	0.53	0.31	0.84	0.12	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	0.01	0.01	<0.01	<0.01	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.01	0.01	<0.01	<0.01	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.6	1.0	0.8	1.6	0.4	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	1.6	1.0	0.8	1.6	0.4	
EK067G: Total Phosphorus as P by Discrete Analyser									



Analytical Results

Sub-Matrix: **WATER**
 (Matrix: **WATER**)

Sample ID

				DG17	DG21	DG31S	DG35	DG36
Sampling date / time				18-Feb-2025 08:05	18-Feb-2025 08:55	18-Feb-2025 00:45	18-Feb-2025 08:35	18-Feb-2025 08:20
Compound	CAS Number	LOR	Unit	EW2500898-001	EW2500898-002	EW2500898-003	EW2500898-004	EW2500898-005
				Result	Result	Result	Result	Result
EK067G: Total Phosphorus as P by Discrete Analyser - Continued								
Total Phosphorus as P	----	0.01	mg/L	2.35	0.32	0.07	1.00	0.24
EN055: Ionic Balance								
∅ Total Anions	----	0.01	meq/L	26.8	10.3	8.50	10.3	14.8
∅ Total Cations	----	0.01	meq/L	26.1	9.69	8.49	10.6	12.7
∅ Ionic Balance	----	0.01	%	1.22	3.16	0.03	1.27	7.76
MW006: Faecal Coliforms & E.coli by MF								
Thermotolerant Coliforms	----	1	CFU/100mL	<1	<1	<1	<1	<1
<i>Escherichia coli</i>	----	1	CFU/100mL	<1	<1	<1	<1	<1
MW023: Enterococci by Membrane Filtration								
<i>Enterococci</i>	----	1	CFU/100mL	~2	<1	<1	<1	<1

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	DG1S	DG5S	DG5D	DG6S	DG6D
Sampling date / time				18-Feb-2025 10:20	18-Feb-2025 10:40	18-Feb-2025 10:40	18-Feb-2025 11:05	18-Feb-2025 11:00	
Compound	CAS Number	LOR	Unit	EW2500898-006	EW2500898-007	EW2500898-008	EW2500898-009	EW2500898-010	
				Result	Result	Result	Result	Result	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	240	276	333	394	440	
Total Alkalinity as CaCO3	----	1	mg/L	240	276	333	394	440	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	128	534	671	1360	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	49	98	4970	5830	9250	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	70	133	216	180	401	
Magnesium	7439-95-4	1	mg/L	11	19	299	404	704	
Sodium	7440-23-5	1	mg/L	40	61	2560	3280	5470	
Potassium	7440-09-7	1	mg/L	2	4	80	121	182	
EG020F: Dissolved Metals by ICP-MS									
Iron	7439-89-6	0.05	mg/L	2.59	2.98	2.49	4.51	20.6	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.92	0.40	1.39	0.63	0.81	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.6	0.8	2.0	1.7	1.9	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	1.6	0.8	2.0	1.7	1.9	
EK067G: Total Phosphorus as P by Discrete Analyser									



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	DG1S	DG5S	DG5D	DG6S	DG6D
Sampling date / time					18-Feb-2025 10:20	18-Feb-2025 10:40	18-Feb-2025 10:40	18-Feb-2025 11:05	18-Feb-2025 11:00
Compound	CAS Number	LOR	Unit		EW2500898-006	EW2500898-007	EW2500898-008	EW2500898-009	EW2500898-010
					Result	Result	Result	Result	Result
EK067G: Total Phosphorus as P by Discrete Analyser - Continued									
Total Phosphorus as P	----	0.01	mg/L		0.22	0.17	0.55	0.28	0.60
EN055: Ionic Balance									
∅ Total Anions	----	0.01	meq/L		6.18	10.9	158	186	298
∅ Total Cations	----	0.01	meq/L		6.19	11.0	149	188	320
∅ Ionic Balance	----	0.01	%		0.10	0.06	2.99	0.45	3.64
MW006: Faecal Coliforms & E.coli by MF									
Thermotolerant Coliforms	----	1	CFU/100mL		~7	<1	<1	<1	<1
<i>Escherichia coli</i>	----	1	CFU/100mL		~3	<1	<1	<1	<1
MW023: Enterococci by Membrane Filtration									
<i>Enterococci</i>	----	1	CFU/100mL		180	11	<1	~3	~1

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	DG7	GW4	MW5A1	MW5A3	MW5B2D
Sampling date / time				18-Feb-2025 09:10	18-Feb-2025 09:40	18-Feb-2025 11:25	18-Feb-2025 11:35	18-Feb-2025 12:00	
Compound	CAS Number	LOR	Unit	EW2500898-011	EW2500898-012	EW2500898-013	EW2500898-014	EW2500898-015	
				Result	Result	Result	Result	Result	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	248	203	90	59	301	
Total Alkalinity as CaCO3	----	1	mg/L	248	203	90	59	301	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	37	11	24	<1	14	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	60	195	60	43	55	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	60	71	18	6	94	
Magnesium	7439-95-4	1	mg/L	17	17	8	3	14	
Sodium	7440-23-5	1	mg/L	74	105	51	44	47	
Potassium	7440-09-7	1	mg/L	2	<1	4	2	6	
EG020F: Dissolved Metals by ICP-MS									
Iron	7439-89-6	0.05	mg/L	0.88	0.08	1.54	0.48	3.73	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.80	0.09	0.54	0.35	0.63	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	0.01	<0.01	<0.01	<0.01	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.01	<0.01	<0.01	<0.01	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.2	0.2	1.3	1.1	1.0	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	1.2	0.2	1.3	1.1	1.0	
EK067G: Total Phosphorus as P by Discrete Analyser									



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Sample ID				DG7	GW4	MW5A1	MW5A3	MW5B2D
Sampling date / time				18-Feb-2025 09:10	18-Feb-2025 09:40	18-Feb-2025 11:25	18-Feb-2025 11:35	18-Feb-2025 12:00
Compound	CAS Number	LOR	Unit	EW2500898-011	EW2500898-012	EW2500898-013	EW2500898-014	EW2500898-015
				Result	Result	Result	Result	Result
EK067G: Total Phosphorus as P by Discrete Analyser - Continued								
Total Phosphorus as P	----	0.01	mg/L	0.18	0.14	0.08	0.12	0.10
EN055: Ionic Balance								
∅ Total Anions	----	0.01	meq/L	7.42	9.78	3.99	2.39	7.86
∅ Total Cations	----	0.01	meq/L	7.66	9.51	3.88	2.51	8.04
∅ Ionic Balance	----	0.01	%	1.62	1.43	1.44	----	1.16
MW006: Faecal Coliforms & E.coli by MF								
Thermotolerant Coliforms	----	1	CFU/100mL	<1	<1	<1	<1	<1
<i>Escherichia coli</i>	----	1	CFU/100mL	<1	<1	<1	<1	<1
MW023: Enterococci by Membrane Filtration								
<i>Enterococci</i>	----	1	CFU/100mL	<1	19	<1	<1	<1

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MW5B2S	MW5B3	MW5B4	----	----
Sampling date / time				18-Feb-2025 12:10	18-Feb-2025 12:15	18-Feb-2025 12:25	----	----	
Compound	CAS Number	LOR	Unit	EW2500898-016	EW2500898-017	EW2500898-018	-----	-----	
				Result	Result	Result	----	----	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	----	----	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	----	----	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	355	245	196	----	----	
Total Alkalinity as CaCO3	----	1	mg/L	355	245	196	----	----	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	<1	2	----	----	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	65	33	19	----	----	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	124	81	65	----	----	
Magnesium	7439-95-4	1	mg/L	11	8	6	----	----	
Sodium	7440-23-5	1	mg/L	47	26	16	----	----	
Potassium	7440-09-7	1	mg/L	4	2	2	----	----	
EG020F: Dissolved Metals by ICP-MS									
Iron	7439-89-6	0.05	mg/L	3.80	0.52	0.58	----	----	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.27	0.46	0.44	----	----	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	----	----	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	<0.01	0.01	----	----	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.01	----	----	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.2	0.7	0.9	----	----	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	1.2	0.7	0.9	----	----	
EK067G: Total Phosphorus as P by Discrete Analyser									



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MW5B2S	MW5B3	MW5B4	----	----
Sampling date / time					18-Feb-2025 12:10	18-Feb-2025 12:15	18-Feb-2025 12:25	----	----
Compound	CAS Number	LOR	Unit		EW2500898-016	EW2500898-017	EW2500898-018	-----	-----
				Result	Result	Result		----	----
EK067G: Total Phosphorus as P by Discrete Analyser - Continued									
Total Phosphorus as P	----	0.01	mg/L		0.17	0.12	0.14	----	----
EN055: Ionic Balance									
∅ Total Anions	----	0.01	meq/L		8.93	5.82	4.49	----	----
∅ Total Cations	----	0.01	meq/L		9.24	5.88	4.48	----	----
∅ Ionic Balance	----	0.01	%		1.72	0.48	0.10	----	----
MW006: Faecal Coliforms & E.coli by MF									
Thermotolerant Coliforms	----	1	CFU/100mL		<1	<1	~1	----	----
<i>Escherichia coli</i>	----	1	CFU/100mL		<1	<1	~1	----	----
MW023: Enterococci by Membrane Filtration									
<i>Enterococci</i>	----	1	CFU/100mL		<1	<1	<1	----	----

Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry / Biology).

(WATER) ED037P: Alkalinity by PC Titrator
 (WATER) EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser
 (WATER) EK061G: Total Kjeldahl Nitrogen By Discrete Analyser
 (WATER) EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser
 (WATER) EK058G: Nitrate as N by Discrete Analyser
 (WATER) EK057G: Nitrite as N by Discrete Analyser
 (WATER) EK055G: Ammonia as N by Discrete Analyser
 (WATER) EK067G: Total Phosphorus as P by Discrete Analyser
 (WATER) EN055: Ionic Balance
 (WATER) ED093F: Dissolved Major Cations
 (WATER) EG020F: Dissolved Metals by ICP-MS
 (WATER) MW023: Enterococci by Membrane Filtration
 (WATER) MW006: Faecal Coliforms & E.coli by MF
 (WATER) ED045G: Chloride by Discrete Analyser
 (WATER) ED041G: Sulfate (Turbidimetric) as SO4 2- by DA



QUALITY CONTROL REPORT

Work Order : **EW2500898**

Page : 1 of 6

Client : **BORAL LIMITED**

Laboratory : Environmental Division NSW South Coast

Contact : Keira Leahy

Contact : Aneta Prosaroski

Address : Boral Dunmore Sand and Soil 38 Tabbita Road
DUNMORE 2529

Address : 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia

Telephone : ----

Telephone : 02 42253125

Project : Quarterly Dunmore Sand & Soil Groundwater

Date Samples Received : 18-Feb-2025

Order number : 6969841

Date Analysis Commenced : 18-Feb-2025

C-O-C number : ----

Issue Date : 27-Feb-2025

Sampler : Client, Keira Leahy

Site : ----

Quote number : EW24BLUCIR0001

No. of samples received : 18

No. of samples analysed : 18



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Prasanna Ganta	Team Leader - Microbiology/Phycology	Sydney Microbiology, Smithfield, NSW



General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key :
 Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 LOR = Limit of reporting
 RPD = Relative Percentage Difference
 # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
ED037P: Alkalinity by PC Titrator (QC Lot: 6384972)									
EW2500898-001	DG17	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	802	803	0.1	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	802	803	0.1	0% - 20%
EW2500898-010	DG6D	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	440	441	0.3	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	440	441	0.3	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 6388122)									
ES2504573-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	178	178	0.0	0% - 20%
ES2504573-011	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	<1	0.0	No Limit
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 6388125)									
EW2500898-003	DG31S	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	200	199	0.0	0% - 20%
EW2500898-012	GW4	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	11	11	0.0	0% - 50%
ED045G: Chloride by Discrete Analyser (QC Lot: 6388123)									
ES2504573-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	300	302	0.9	0% - 20%
ES2504573-011	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	50	55	9.4	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 6388124)									
EW2500898-003	DG31S	ED045G: Chloride	16887-00-6	1	mg/L	34	34	0.0	0% - 20%
EW2500898-012	GW4	ED045G: Chloride	16887-00-6	1	mg/L	195	201	3.2	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 6397931)									
EW2500898-001	DG17	ED093F: Calcium	7440-70-2	1	mg/L	88	88	0.0	0% - 20%

Page : 3 of 6
 Work Order : EW2500898
 Client : BORAL LIMITED
 Project : Quarterly Dunmore Sand & Soil Groundwater



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
ED093F: Dissolved Major Cations (QC Lot: 6397931) - continued									
EW2500898-001	DG17	ED093F: Magnesium	7439-95-4	1	mg/L	94	94	0.0	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	303	302	0.0	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	32	33	0.0	0% - 20%
EW2500898-011	DG7	ED093F: Calcium	7440-70-2	1	mg/L	60	60	0.0	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	17	17	0.0	0% - 50%
		ED093F: Sodium	7440-23-5	1	mg/L	74	74	0.0	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	2	2	0.0	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 6397932)									
EW2500898-001	DG17	EG020A-F: Iron	7439-89-6	0.05	mg/L	1.03	1.04	0.0	0% - 20%
EW2500898-011	DG7	EG020A-F: Iron	7439-89-6	0.05	mg/L	0.88	0.88	0.0	0% - 50%
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 6399674)									
EW2500898-001	DG17	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.92	0.92	0.0	0% - 20%
EW2500898-010	DG6D	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.81	0.82	0.0	0% - 20%
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 6388120)									
ES2504573-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.01	0.0	No Limit
ES2504573-011	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	0.01	0.01	0.0	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 6388126)									
EW2500898-003	DG31S	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EW2500898-012	GW4	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 6399675)									
EW2500898-001	DG17	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EW2500898-010	DG6D	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 6399673)									
EW2500898-001	DG17	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.6	1.5	0.0	0% - 50%
EW2500898-011	DG7	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.2	1.1	0.0	0% - 50%
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 6399672)									
EW2500898-001	DG17	EK067G: Total Phosphorus as P	----	0.01	mg/L	2.35	2.34	0.0	0% - 20%
EW2500898-011	DG7	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.18	0.22	19.8	0% - 20%

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
ED037P: Alkalinity by PC Titrator (QCLot: 6384972)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	101	81.0	115
				----	50 mg/L	103	80.0	128
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 6388122)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	103	82.0	122
				<1	500 mg/L	92.1	82.0	122
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 6388125)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	98.8	82.0	122
				<1	500 mg/L	107	82.0	122
ED045G: Chloride by Discrete Analyser (QCLot: 6388123)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	50 mg/L	116	80.9	127
				<1	1000 mg/L	95.8	80.9	127
ED045G: Chloride by Discrete Analyser (QCLot: 6388124)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	50 mg/L	109	80.9	127
				<1	1000 mg/L	108	80.9	127
ED093F: Dissolved Major Cations (QCLot: 6397931)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	104	80.0	114
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	106	90.0	116
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	103	82.0	120
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	103	85.0	113
EG020F: Dissolved Metals by ICP-MS (QCLot: 6397932)								
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	98.0	82.0	112
EK055G: Ammonia as N by Discrete Analyser (QCLot: 6399674)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	0.5 mg/L	103	90.0	114
EK057G: Nitrite as N by Discrete Analyser (QCLot: 6388120)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	108	82.0	114
EK057G: Nitrite as N by Discrete Analyser (QCLot: 6388126)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	110	82.0	114
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 6399675)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	99.9	91.0	113
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 6399673)								

Page : 5 of 6
 Work Order : EW2500898
 Client : BORAL LIMITED
 Project : Quarterly Dunmore Sand & Soil Groundwater



Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result			Low	High
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 6399673) - continued								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	5 mg/L	109	69.0	123
				<0.1	2.5 mg/L	103	70.0	123
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 6399672)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	2.21 mg/L	108	71.3	126
				<0.01	0.5 mg/L	95.8	71.3	126

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery (%) MS	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number			Low	High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 6388122)							
ES2504573-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	# Not Determined	70.0	130
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 6388125)							
EW2500898-003	DG31S	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	# Not Determined	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 6388123)							
ES2504573-001	Anonymous	ED045G: Chloride	16887-00-6	250 mg/L	93.0	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 6388124)							
EW2500898-003	DG31S	ED045G: Chloride	16887-00-6	250 mg/L	92.2	70.0	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 6399674)							
EW2500898-001	DG17	EK055G: Ammonia as N	7664-41-7	0.5 mg/L	104	70.0	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 6388120)							
ES2504573-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	102	70.0	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 6388126)							
EW2500898-003	DG31S	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	90.4	70.0	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 6399675)							
EW2500898-001	DG17	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	106	70.0	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 6399673)							
EW2500898-002	DG21	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	104	70.0	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 6399672)							
EW2500898-002	DG21	EK067G: Total Phosphorus as P	----	1 mg/L	96.3	70.0	130





QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EW2500898	Page	: 1 of 10
Client	: BORAL LIMITED	Laboratory	: Environmental Division NSW South Coast
Contact	: Keira Leahy	Telephone	: 02 42253125
Project	: Quarterly Dunmore Sand & Soil Groundwater	Date Samples Received	: 18-Feb-2025
Site	: ----	Issue Date	: 27-Feb-2025
Sampler	: Client, Keira Leahy	No. of samples received	: 18
Order number	: 6969841	No. of samples analysed	: 18

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Duplicate outliers occur.
- **NO** Laboratory Control outliers occur.
- Matrix Spike outliers exist - please see following pages for full details.
- For all regular sample matrices, where applicable to the methodology, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- **NO** Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers exist - please see following pages for full details.

Page : 2 of 10
 Work Order : EW2500898
 Client : BORAL LIMITED
 Project : Quarterly Dunmore Sand & Soil Groundwater



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	EW2500898--003	DG31S	Sulfate as SO4 - Turbidimetric	14808-79-8	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	ES2504573--001	Anonymous	Sulfate as SO4 - Turbidimetric	14808-79-8	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type		Count		Rate (%)		Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	
Matrix Spikes (MS)						
Dissolved Metals by ICP-MS - Suite A	EG020A-F	0	18	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED037P: Alkalinity by PC Titrator								
Clear Plastic Bottle - Natural (ED037-P)		18-Feb-2025	----	----	----	19-Feb-2025	04-Mar-2025	✓
DG17,	DG21,							
DG31S,	DG35,							
DG36,	DG1S,							
DG5S,	DG5D,							
DG6S,	DG6D,							
DG7,	GW4,							
MW5A1,	MW5A3,							
MW5B2D,	MW5B2S,							
MW5B3,	MW5B4							

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Clear Plastic Bottle - Natural (ED041G) DG17, MW5A3, MW5B3	DG1S, MW5B2S,	18-Feb-2025	----	----	----	19-Feb-2025	18-Mar-2025	✓
Clear Plastic Bottle - Natural (ED041G) DG21, DG35, DG5S, DG6S, DG7, MW5A1, MW5B4	DG31S, DG35, DG5D, DG6D, GW4, MW5B2D,	18-Feb-2025	----	----	----	20-Feb-2025	18-Mar-2025	✓
ED045G: Chloride by Discrete Analyser								
Clear Plastic Bottle - Natural (ED045G) DG17, DG31S, DG36, DG5S, DG6S, DG7, MW5A1, MW5B2D, MW5B3,	DG21, DG35, DG1S, DG5D, DG6D, GW4, MW5A3, MW5B2S, MW5B4	18-Feb-2025	----	----	----	20-Feb-2025	18-Mar-2025	✓
ED093F: Dissolved Major Cations								
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F) DG17, DG31S, DG36, DG5S, DG6S, DG7, MW5A1, MW5B2D, MW5B3,	DG21, DG35, DG1S, DG5D, DG6D, GW4, MW5A3, MW5B2S, MW5B4	18-Feb-2025	----	----	----	25-Feb-2025	18-Mar-2025	✓

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EG020F: Dissolved Metals by ICP-MS									
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)	DG17, DG31S, DG36, DG5S, DG6S, DG7, MW5A1, MW5B2D, MW5B3,	DG21, DG35, DG1S, DG5D, DG6D, GW4, MW5A3, MW5B2S, MW5B4	18-Feb-2025	----	----	----	25-Feb-2025	17-Aug-2025	✓
EK055G: Ammonia as N by Discrete Analyser									
Clear Plastic Bottle - Sulfuric Acid (EK055G)	DG17, DG31S, DG36, DG5S, DG6S, DG7, MW5A1, MW5B2D, MW5B3,	DG21, DG35, DG1S, DG5D, DG6D, GW4, MW5A3, MW5B2S, MW5B4	18-Feb-2025	----	----	----	26-Feb-2025	18-Mar-2025	✓
EK057G: Nitrite as N by Discrete Analyser									
Clear Plastic Bottle - Natural (EK057G)	DG6D		18-Feb-2025	----	----	----	19-Feb-2025	20-Feb-2025	✓
Clear Plastic Bottle - Natural (EK057G)	DG17, DG31S, DG36, DG5S, DG6S, GW4, MW5A3, MW5B2S, MW5B4	DG21, DG35, DG1S, DG5D, DG7, MW5A1, MW5B2D, MW5B3,	18-Feb-2025	----	----	----	20-Feb-2025	20-Feb-2025	✓



Matrix: **WATER**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK059G) DG36, DG7, MW5B2S	DG5D, MW5A1,	18-Feb-2025	----	----	----	25-Feb-2025	18-Mar-2025	✓
Clear Plastic Bottle - Sulfuric Acid (EK059G) DG17, DG31S, DG1S, DG6S, GW4, MW5B2D, MW5B4	DG21, DG35, DG5S, DG6D, MW5A3, MW5B3,	18-Feb-2025	----	----	----	26-Feb-2025	18-Mar-2025	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK061G) DG17, DG31S, DG36, DG5S, DG6S, DG7, MW5A1, MW5B2D, MW5B3,	DG21, DG35, DG1S, DG5D, DG6D, GW4, MW5A3, MW5B2S, MW5B4	18-Feb-2025	25-Feb-2025	18-Mar-2025	✓	25-Feb-2025	18-Mar-2025	✓
EK067G: Total Phosphorus as P by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK067G) DG17, DG31S, DG36, DG5S, DG6S, DG7, MW5A1, MW5B2D, MW5B3,	DG21, DG35, DG1S, DG5D, DG6D, GW4, MW5A3, MW5B2S, MW5B4	18-Feb-2025	25-Feb-2025	18-Mar-2025	✓	25-Feb-2025	18-Mar-2025	✓

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
MW006: Faecal Coliforms & E.coli by MF								
Sterile Plastic Bottle - Sodium Thiosulfate (MW006)		18-Feb-2025	----	----	----	18-Feb-2025	19-Feb-2025	✓
DG17,	DG21,							
DG31S,	DG35,							
DG36,	DG1S,							
DG5S,	DG5D,							
DG6S,	DG6D,							
DG7,	GW4,							
MW5A1,	MW5A3,							
MW5B2D,	MW5B2S,							
MW5B3,	MW5B4							
MW023: Enterococci by Membrane Filtration								
Sterile Plastic Bottle - Sodium Thiosulfate (MW023)		18-Feb-2025	----	----	----	18-Feb-2025	19-Feb-2025	✓
DG17,	DG21,							
DG31S,	DG35,							
DG36,	DG1S,							
DG5S,	DG5D,							
DG6S,	DG6D,							
DG7,	GW4,							
MW5A1,	MW5A3,							
MW5B2D,	MW5B2S,							
MW5B3,	MW5B4							



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Alkalinity by Auto Titrator	ED037-P	2	18	11.11	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	4	36	11.11	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	18	11.11	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	18	11.11	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	4	36	11.11	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	4	36	11.11	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by Auto Titrator	ED037-P	2	18	11.11	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	4	36	11.11	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	36	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	4	36	11.11	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	3	20	15.00	15.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	36	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	36	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	36	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	36	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	0	18	0.00	5.00	✗	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Matrix: **WATER**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification .

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Matrix Spikes (MS) - Continued							
Nitrite as N by Discrete Analyser	EK057G	2	36	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	36	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Alkalinity by Auto Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO ₄ 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO ₄ . Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO ₄ suspension is measured by a photometer and the SO ₄ -2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G. The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocyanate forms highly-coloured ferric thiocyanate which is measured at 480 nm.
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM Schedule B(3)
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45um filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH ₃ G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO ₂ - B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO ₃ - F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined separately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM Schedule B(3)
Nitrite and Nitrate as N (NO _x) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO ₃ - F. Combined oxidised Nitrogen (NO ₂ +NO ₃) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO ₃ -. This method is compliant with NEPM Schedule B(3)



<i>Analytical Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al, Zhang et al. This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030E. This method is compliant with NEPM Schedule B(3)
Thermotolerant Coliforms & E.coli by Membrane Filtration	MW006	WATER	AS 4276.5
Enumeration of Enterococci by Membrane Filtration	MW023	WATER	AS4276.9
<i>Preparation Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM Schedule B(3)



SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **EW2500898**

Client	: BORAL LIMITED	Laboratory	: Environmental Division NSW South Coast
Contact	: SHARON MAKIN	Contact	: Aneta Prosaroski
Address	: Boral Dunmore Sand and Soil 38 Tabbita Road DUNMORE 2529	Address	: 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia
E-mail	: sharon.makin@boral.com.au	E-mail	: Aneta.Prosaroski@ALSGlobal.com
Telephone	: +61 02 4841 1701	Telephone	: 02 42253125
Facsimile	: ----	Facsimile	: W 02 42253128 N 02 44232083
Project	: Quarterly Dunmore Sand & Soil Groundwater	Page	: 1 of 3
Order number	: ----	Quote number	: EW2024BLUCIR0001 (EW24BLUCIR0001)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: Client, Keira Leahy		

Dates

Date Samples Received	: 18-Feb-2025 13:59	Issue Date	: 18-Feb-2025
Client Requested Due Date	: 27-Feb-2025	Scheduled Reporting Date	: 27-Feb-2025

Delivery Details

Mode of Delivery	: Client Drop Off	Security Seal	: Not Available
No. of coolers/boxes	: ----	Temperature	: 14.7, 4.5, 9.9 - Ice Bricks present
Receipt Detail	:	No. of samples received / analysed	: 18 / 18

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- **Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.**
- **Please direct any queries you have regarding this work order to the above ALS laboratory contact.**
- **Unless otherwise stated, analytical work for this work order will be conducted at ALS Sydney, NATA accreditation no. 825, site no. 10911.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- No sample container / preservation non-compliance exists.

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - EG020F Dissolved Metals by ICP/MS	WATER - EN055 - PG Ionic Balance by ED037P, ED041G, ED045G &	WATER - M3 - ES/EB/FM FC & E.coli by MF	WATER - MW023 Enterococci - Enumeration by Membrane	WATER - NT-01 Major Cations (Ca, Mg, Na, K)	WATER - NT-02 Major Anions (Chloride, Sulphate, Alkalinity)	WATER - NT-08 Total Nitrogen + NO2 + NO3 + NH3 + Total P
EW2500898-001	18-Feb-2025 08:05	DG17	✓	✓	✓	✓	✓	✓	✓
EW2500898-002	18-Feb-2025 08:55	DG21	✓	✓	✓	✓	✓	✓	✓
EW2500898-003	18-Feb-2025 00:45	DG31S	✓	✓	✓	✓	✓	✓	✓
EW2500898-004	18-Feb-2025 08:35	DG35	✓	✓	✓	✓	✓	✓	✓
EW2500898-005	18-Feb-2025 08:20	DG36	✓	✓	✓	✓	✓	✓	✓
EW2500898-006	18-Feb-2025 10:20	DG1S	✓	✓	✓	✓	✓	✓	✓
EW2500898-007	18-Feb-2025 10:40	DG5S	✓	✓	✓	✓	✓	✓	✓
EW2500898-008	18-Feb-2025 10:40	DG5D	✓	✓	✓	✓	✓	✓	✓
EW2500898-009	18-Feb-2025 11:05	DG6S	✓	✓	✓	✓	✓	✓	✓
EW2500898-010	18-Feb-2025 11:00	DG6D	✓	✓	✓	✓	✓	✓	✓
EW2500898-011	18-Feb-2025 09:10	DG7	✓	✓	✓	✓	✓	✓	✓
EW2500898-012	18-Feb-2025 09:40	GW4	✓	✓	✓	✓	✓	✓	✓
EW2500898-013	18-Feb-2025 11:25	MW5A1	✓	✓	✓	✓	✓	✓	✓
EW2500898-014	18-Feb-2025 11:35	MW5A3	✓	✓	✓	✓	✓	✓	✓
EW2500898-015	18-Feb-2025 12:00	MW5B2D	✓	✓	✓	✓	✓	✓	✓
EW2500898-016	18-Feb-2025 12:10	MW5B2S	✓	✓	✓	✓	✓	✓	✓
EW2500898-017	18-Feb-2025 12:15	MW5B3	✓	✓	✓	✓	✓	✓	✓
EW2500898-018	18-Feb-2025 12:25	MW5B4	✓	✓	✓	✓	✓	✓	✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.



Requested Deliverables

ACCOUNTS INVOICES

- A4 - AU Tax Invoice (INV)	Email	einvoice@boral.com.au
-----------------------------	-------	-----------------------

Keira Leahy

- *AU Certificate of Analysis - NATA (COA)	Email	keira.leahy@iec.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	keira.leahy@iec.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	keira.leahy@iec.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	keira.leahy@iec.com.au
- Chain of Custody (CoC) (COC)	Email	keira.leahy@iec.com.au
- EDI Format - XTab (XTAB)	Email	keira.leahy@iec.com.au

SHARON MAKIN

- *AU Certificate of Analysis - NATA (COA)	Email	sharon.makin@boral.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	sharon.makin@boral.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	sharon.makin@boral.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	sharon.makin@boral.com.au
- A4 - AU Tax Invoice (INV)	Email	sharon.makin@boral.com.au
- Chain of Custody (CoC) (COC)	Email	sharon.makin@boral.com.au
- EDI Format - XTab (XTAB)	Email	sharon.makin@boral.com.au
- Purchase Order Request Letter (PO_Request)	Email	sharon.makin@boral.com.au

Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry / Biology).

(WATER) ED037P: Alkalinity by PC Titrator
(WATER) EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser
(WATER) EK061G: Total Kjeldahl Nitrogen By Discrete Analyser
(WATER) EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser
(WATER) EK058G: Nitrate as N by Discrete Analyser
(WATER) EK057G: Nitrite as N by Discrete Analyser
(WATER) EK055G: Ammonia as N by Discrete Analyser
(WATER) EK067G: Total Phosphorus as P by Discrete Analyser
(WATER) EN055: Ionic Balance
(WATER) ED093F: Dissolved Major Cations
(WATER) EG020F: Dissolved Metals by ICP-MS
(WATER) MW023: Enterococci by Membrane Filtration
(WATER) MW006: Faecal Coliforms & E.coli by MF
(WATER) ED045G: Chloride by Discrete Analyser
(WATER) ED041G: Sulfate (Turbidimetric) as SO4 2- by DA

Environmental Division
Wollongong
Work Order Reference
EW2500898



Telephone : 02 42253125



CERTIFICATE OF ANALYSIS

Work Order	: ES2514817	Page	: 1 of 10
Client	: BORAL LIMITED	Laboratory	: Environmental Division Sydney
Contact	: Ionut CiobanuOprea	Contact	: Customer Services ES
Address	: Boral Dunmore Sand and Soil 38 Tabbita Road DUNMORE 2529	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: Quarterly Dunmore Sand & Soil Groundwater	Date Samples Received	: 21-May-2025 08:00
Order number	: 7002716	Date Analysis Commenced	: 21-May-2025
C-O-C number	: ----	Issue Date	: 27-May-2025 16:36
Sampler	: ----		
Site	: Dunmore Sand & Soil		
Quote number	: EW24BLUCIR0001		
No. of samples received	: 18		
No. of samples analysed	: 18		



Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Sarah Griffiths	Microbiologist	Sydney Microbiology, Smithfield, NSW



General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- MF = membrane filtration
- CFU = colony forming unit
- Microbiological Comment: In accordance with ALS work instruction QWI-MIC/04, membrane filtration result is reported an approximate (~) when the count of colonies on the filtered membrane is outside the range of 10 - 100cfu.
- MW006 is ALS's internal code and is equivalent to AS4276.5.
- Microbiological Comment: ES2514817 – 01 & 12 results for MW006 are reported as estimate (~) due to the presence of many non-target organism colonies that may have inhibited the growth of the target organisms on the filter membrane. It may be informative to record this fact.
- ED041G: LOR raised for Sulfate due to sample matrix
- MW023 is ALS's internal code and is equivalent to AS4276.9.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	DG17	DG21	DG31S	DG35	DG36
Sampling date / time				20-May-2025 08:25	20-May-2025 09:20	20-May-2025 09:15	20-May-2025 09:00	20-May-2025 08:45	
Compound	CAS Number	LOR	Unit	ES2514817-001	ES2514817-002	ES2514817-003	ES2514817-004	ES2514817-005	
				Result	Result	Result	Result	Result	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	621	126	141	313	403	
Total Alkalinity as CaCO3	----	1	mg/L	621	126	141	313	403	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	69	80	163	139	60	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	303	184	26	54	69	
ED093T: Total Major Cations									
Calcium	7440-70-2	1	mg/L	112	21	93	66	99	
Magnesium	7439-95-4	1	mg/L	81	15	17	32	42	
Sodium	7440-23-5	1	mg/L	257	162	32	108	89	
Potassium	7440-09-7	1	mg/L	28	2	3	8	16	
EG020F: Dissolved Metals by ICP-MS									
Iron	7439-89-6	0.05	mg/L	1.23	1.00	1.07	36.3	2.56	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.84	0.55	0.19	0.58	0.11	
EK055G-NH4: Ammonium as N by DA									
Ammonium as N	14798-03-9_N	0.01	mg/L	0.84	0.55	0.19	0.58	0.11	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	0.03	0.01	<0.01	0.02	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	0.01	0.03	0.01	<0.01	0.02	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.5	1.0	0.6	1.2	0.3	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	DG17	DG21	DG31S	DG35	DG36
Sampling date / time					20-May-2025 08:25	20-May-2025 09:20	20-May-2025 09:15	20-May-2025 09:00	20-May-2025 08:45
Compound	CAS Number	LOR	Unit		ES2514817-001	ES2514817-002	ES2514817-003	ES2514817-004	ES2514817-005
					Result	Result	Result	Result	Result
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser - Continued									
^ Total Nitrogen as N	----	0.1	mg/L		1.5	1.0	0.6	1.2	0.3
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		2.32	0.32	0.03	1.02	0.21
MW006: Faecal Coliforms & E.coli by MF									
Thermotolerant Coliforms	----	1	CFU/100mL		~<1	<1	<1	<1	<1
<i>Escherichia coli</i>	----	1	CFU/100mL		~<1	<1	<1	<1	<1
MW023: Enterococci by Membrane Filtration									
Enterococci	----	1	CFU/100mL		36	<1	<1	<1	<1

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	DG1S	DG5S	DG5D	DG6S	DG6D
Sampling date / time				20-May-2025 10:50	20-May-2025 11:10	20-May-2025 11:20	20-May-2025 11:30	20-May-2025 11:40	
Compound	CAS Number	LOR	Unit	ES2514817-006	ES2514817-007	ES2514817-008	ES2514817-009	ES2514817-010	
				Result	Result	Result	Result	Result	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	232	247	296	342	384	
Total Alkalinity as CaCO3	----	1	mg/L	232	247	296	342	384	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	132	579	702	1400	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	44	95	4850	5590	8640	
ED093T: Total Major Cations									
Calcium	7440-70-2	1	mg/L	80	136	234	199	432	
Magnesium	7439-95-4	1	mg/L	11	19	334	420	709	
Sodium	7440-23-5	1	mg/L	42	64	2800	3360	5480	
Potassium	7440-09-7	1	mg/L	2	4	90	123	177	
EG020F: Dissolved Metals by ICP-MS									
Iron	7439-89-6	0.05	mg/L	3.43	3.05	2.26	4.92	17.3	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.83	0.39	1.27	0.69	0.96	
EK055G-NH4: Ammonium as N by DA									
Ammonium as N	14798-03-9_N	0.01	mg/L	0.82	0.39	1.25	0.69	0.96	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	<0.01	0.02	<0.01	0.02	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.02	<0.01	0.02	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.4	0.8	1.7	1.7	2.1	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	DG1S	DG5S	DG5D	DG6S	DG6D
Sampling date / time					20-May-2025 10:50	20-May-2025 11:10	20-May-2025 11:20	20-May-2025 11:30	20-May-2025 11:40
Compound	CAS Number	LOR	Unit		ES2514817-006	ES2514817-007	ES2514817-008	ES2514817-009	ES2514817-010
					Result	Result	Result	Result	Result
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser - Continued									
^ Total Nitrogen as N	----	0.1	mg/L		1.4	0.8	1.7	1.7	2.1
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		0.20	0.17	0.50	0.21	0.59
MW006: Faecal Coliforms & E.coli by MF									
Thermotolerant Coliforms	----	1	CFU/100mL		<1	<1	<1	<1	<1
<i>Escherichia coli</i>	----	1	CFU/100mL		<1	<1	<1	<1	<1
MW023: Enterococci by Membrane Filtration									
Enterococci	----	1	CFU/100mL		<1	<1	<1	<1	<1

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	DG7	GW4	MW5A1	MW5A3	MW5B2D
Sampling date / time				20-May-2025 09:30	20-May-2025 10:20	20-May-2025 11:50	20-May-2025 12:00	20-May-2025 12:10	
Compound	CAS Number	LOR	Unit	ES2514817-011	ES2514817-012	ES2514817-013	ES2514817-014	ES2514817-015	
				Result	Result	Result	Result	Result	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	237	182	91	58	257	
Total Alkalinity as CaCO3	----	1	mg/L	237	182	91	58	257	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	35	11	23	<10	12	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	48	194	46	42	62	
ED093T: Total Major Cations									
Calcium	7440-70-2	1	mg/L	65	77	30	8	93	
Magnesium	7439-95-4	1	mg/L	18	18	9	3	13	
Sodium	7440-23-5	1	mg/L	74	108	44	46	51	
Potassium	7440-09-7	1	mg/L	2	<1	5	3	6	
EG020F: Dissolved Metals by ICP-MS									
Iron	7439-89-6	0.05	mg/L	1.75	0.09	2.26	0.57	3.76	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	1.11	0.05	0.42	0.38	0.59	
EK055G-NH4: Ammonium as N by DA									
Ammonium as N	14798-03-9_N	0.01	mg/L	1.11	0.05	0.42	0.38	0.59	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	0.03	<0.01	0.01	0.01	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.03	<0.01	0.01	0.01	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.4	0.2	1.3	1.4	1.1	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	DG7	GW4	MW5A1	MW5A3	MW5B2D
Sampling date / time					20-May-2025 09:30	20-May-2025 10:20	20-May-2025 11:50	20-May-2025 12:00	20-May-2025 12:10
Compound	CAS Number	LOR	Unit		ES2514817-011	ES2514817-012	ES2514817-013	ES2514817-014	ES2514817-015
					Result	Result	Result	Result	Result
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser - Continued									
^ Total Nitrogen as N	----	0.1	mg/L		1.4	0.2	1.3	1.4	1.1
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		0.66	0.03	0.06	0.08	0.10
MW006: Faecal Coliforms & E.coli by MF									
Thermotolerant Coliforms	----	1	CFU/100mL		<1	~25	<1	~1	<1
<i>Escherichia coli</i>	----	1	CFU/100mL		<1	~<1	<1	<1	<1
MW023: Enterococci by Membrane Filtration									
Enterococci	----	1	CFU/100mL		<1	21	<1	<1	<1



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	MW5B2S	MW5B3	MW5B4	----	----	
Sampling date / time				20-May-2025 12:20	20-May-2025 12:30	20-May-2025 12:40	----	----	
Compound	CAS Number	LOR	Unit	ES2514817-016	ES2514817-017	ES2514817-018	-----	-----	
				Result	Result	Result	----	----	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser - Continued									
^ Total Nitrogen as N		----	0.1	mg/L	1.3	0.8	1.1	----	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P		----	0.01	mg/L	0.16	0.09	0.10	----	----
MW006: Faecal Coliforms & E.coli by MF									
Thermotolerant Coliforms		----	1	CFU/100mL	<1	<1	<1	----	----
Escherichia coli		----	1	CFU/100mL	<1	<1	<1	----	----
MW023: Enterococci by Membrane Filtration									
Enterococci		----	1	CFU/100mL	<1	<1	~1	----	----



QUALITY CONTROL REPORT

Work Order	: ES2514817	Page	: 1 of 7
Client	: BORAL LIMITED	Laboratory	: Environmental Division Sydney
Contact	: Ionut CiobanuOprea	Contact	: Customer Services ES
Address	: Boral Dunmore Sand and Soil 38 Tabbita Road DUNMORE 2529	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: Quarterly Dunmore Sand & Soil Groundwater	Date Samples Received	: 21-May-2025
Order number	: 7002716	Date Analysis Commenced	: 21-May-2025
C-O-C number	: ----	Issue Date	: 27-May-2025
Sampler	: ----		
Site	: Dunmore Sand & Soil		
Quote number	: EW24BLUCIR0001		
No. of samples received	: 18		
No. of samples analysed	: 18		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Sarah Griffiths	Microbiologist	Sydney Microbiology, Smithfield, NSW



General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot

CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

RPD = Relative Percentage Difference

= Indicates failed QC

* = The final LOR has been raised due to dilution or other sample specific cause; adjusted LOR is shown in brackets. The duplicate ranges for Acceptable RPD% are applied to the final LOR where applicable.

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
ED037P: Alkalinity by PC Titrator (QC Lot: 6591907)									
ES2514817-001	DG17	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	621	620	0.0	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	621	620	0.0	0% - 20%
ES2514817-010	DG6D	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	384	387	0.7	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	384	387	0.7	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 6593990)									
ES2514817-003	DG31S	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	163	160	1.5	0% - 20%
ED2500804-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1 (100)*	mg/L	441	294	39.9	No Limit
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 6593995)									
ME2500741-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	6	6	0.0	No Limit
ES2514817-014	MW5A3	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1 (10)*	mg/L	<10	<10	0.0	No Limit
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 6594433)									
ES2514946-003	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	12	12	0.0	0% - 50%
EN2508346-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	14	14	0.0	0% - 50%
ED045G: Chloride by Discrete Analyser (QC Lot: 6593991)									
ES2514817-003	DG31S	ED045G: Chloride	16887-00-6	1	mg/L	26	26	0.0	0% - 20%
ED2500804-001	Anonymous	ED045G: Chloride	16887-00-6	1 (100)*	mg/L	2100	2100	0.1	0% - 20%

Page : 3 of 7
 Work Order : ES2514817
 Client : BORAL LIMITED
 Project : Quarterly Dunmore Sand & Soil Groundwater



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
ED045G: Chloride by Discrete Analyser (QC Lot: 6593994)									
ES2514817-014	MW5A3	ED045G: Chloride	16887-00-6	1	mg/L	42	42	0.0	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 6594434)									
EW2502679-003	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	40	41	0.0	0% - 20%
EN2508346-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	84	85	1.6	0% - 20%
ED093T: Total Major Cations (QC Lot: 6597440)									
ES2514680-001	Anonymous	ED093T: Calcium	7440-70-2	1	mg/L	2	1	0.0	No Limit
		ED093T: Magnesium	7439-95-4	1	mg/L	<1	<1	0.0	No Limit
		ED093T: Sodium	7440-23-5	1	mg/L	8	8	0.0	No Limit
		ED093T: Potassium	7440-09-7	1	mg/L	<1	<1	0.0	No Limit
ES2514817-009	DG6S	ED093T: Calcium	7440-70-2	1	mg/L	199	200	0.0	0% - 20%
		ED093T: Magnesium	7439-95-4	1	mg/L	420	421	0.3	0% - 20%
		ED093T: Sodium	7440-23-5	1	mg/L	3360	3390	0.8	0% - 20%
		ED093T: Potassium	7440-09-7	1	mg/L	123	123	0.0	0% - 20%
EG020F: Dissolved Metals by ICP-MS (QC Lot: 6596944)									
ES2514653-003	Anonymous	EG020A-F: Iron	7439-89-6	0.05	mg/L	0.05	0.05	0.0	No Limit
ES2514807-008	Anonymous	EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.0	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 6596946)									
ES2514817-006	DG1S	EG020A-F: Iron	7439-89-6	0.05	mg/L	3.43	3.38	1.3	0% - 20%
ES2514817-016	MW5B2S	EG020A-F: Iron	7439-89-6	0.05	mg/L	4.30	4.19	2.7	0% - 20%
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 6597433)									
ES2514817-009	DG6S	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.69	0.70	1.6	0% - 20%
ED2500804-002	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01 (0.10)*	mg/L	13.2	13.2	0.0	0% - 20%
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 6593988)									
ES2514734-002	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	0.26	0.26	0.0	0% - 20%
ED2500804-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01 (1.00)*	mg/L	<1.00	<1.00	0.0	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 6593993)									
ES2514817-006	DG1S	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
ES2514817-015	MW5B2D	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 6594435)									
ES2514817-017	MW5B3	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EN2508346-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 6597434)									
ES2514817-008	DG5D	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.02	0.01	0.0	No Limit
ED2500804-002	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01 (1.00)*	mg/L	31.8	28.7	10.2	0% - 20%
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 6597430)									
ED2500804-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1 (5.0)*	mg/L	117	107	8.8	0% - 20%



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 6597430) - continued									
ES2514817-009	DG6S	EK061G: Total Kjeldahl Nitrogen as N	----	0.1 (0.2)*	mg/L	1.7	1.8	6.9	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 6597429)									
ED2500804-002	Anonymous	EK067G: Total Phosphorus as P	----	0.01 (0.50)*	mg/L	4.96	4.26	15.2	No Limit
ES2514817-009	DG6S	EK067G: Total Phosphorus as P	----	0.01 (0.02)*	mg/L	0.21	0.18	18.5	0% - 50%

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
ED037P: Alkalinity by PC Titrator (QCLot: 6591907)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	94.8	81.0	115
				----	50 mg/L	92.7	80.0	128
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 6593990)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	102	82.0	122
				<1	500 mg/L	97.3	82.0	122
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 6593995)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	96.5	82.0	122
				<1	500 mg/L	99.8	82.0	122
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 6594433)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	106	82.0	122
				<1	500 mg/L	94.4	82.0	122
ED045G: Chloride by Discrete Analyser (QCLot: 6593991)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	50 mg/L	106	80.9	127
				<1	1000 mg/L	93.4	80.9	127
ED045G: Chloride by Discrete Analyser (QCLot: 6593994)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	50 mg/L	112	80.9	127
				<1	1000 mg/L	93.2	80.9	127
ED045G: Chloride by Discrete Analyser (QCLot: 6594434)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	50 mg/L	106	80.9	127
				<1	1000 mg/L	104	80.9	127
ED093T: Total Major Cations (QCLot: 6597440)								
ED093T: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	111	83.0	117
ED093T: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	107	82.0	120
ED093T: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	104	78.0	124
ED093T: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	104	82.0	122
EG020F: Dissolved Metals by ICP-MS (QCLot: 6596944)								
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	99.2	82.0	112
EG020F: Dissolved Metals by ICP-MS (QCLot: 6596946)								
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	98.0	82.0	112
EK055G: Ammonia as N by Discrete Analyser (QCLot: 6597433)								



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EK055G: Ammonia as N by Discrete Analyser (QCLot: 6597433) - continued								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	0.5 mg/L	110	90.0	114
EK057G: Nitrite as N by Discrete Analyser (QCLot: 6593988)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	108	82.0	114
EK057G: Nitrite as N by Discrete Analyser (QCLot: 6593993)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	108	82.0	114
EK057G: Nitrite as N by Discrete Analyser (QCLot: 6594435)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	108	82.0	114
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 6597434)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	104	91.0	113
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 6597430)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	5 mg/L	93.7	69.0	123
				<0.1	2.5 mg/L	91.3	70.0	123
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 6597429)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	2.21 mg/L	94.9	71.3	126
				<0.01	0.5 mg/L	97.3	71.3	126

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery(%) MS	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number			Low	High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 6593990)							
ED2500804-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	# Not Determined	70.0	130
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 6593995)							
ES2514817-014	MW5A3	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	100 mg/L	127	70.0	130
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 6594433)							
EN2508346-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	80.0	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 6593991)							
ED2500804-001	Anonymous	ED045G: Chloride	16887-00-6	250 mg/L	# Not Determined	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 6593994)							
ES2514817-014	MW5A3	ED045G: Chloride	16887-00-6	250 mg/L	120	70.0	130



Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED045G: Chloride by Discrete Analyser (QCLot: 6594434)							
EN2508346-001	Anonymous	ED045G: Chloride	16887-00-6	250 mg/L	127	70.0	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 6597433)							
ED2500804-002	Anonymous	EK055G: Ammonia as N	7664-41-7	5 mg/L	96.1	70.0	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 6593988)							
ED2500804-001	Anonymous	EK057G: Nitrite as N	14797-65-0	50 mg/L	117	70.0	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 6593993)							
ES2514817-006	DG1S	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	116	70.0	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 6594435)							
EN2508346-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	118	70.0	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 6597434)							
ED2500804-002	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	# Not Determined	70.0	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 6597430)							
ES2514809-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	95.3	70.0	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 6597429)							
ES2514809-001	Anonymous	EK067G: Total Phosphorus as P	----	1 mg/L	# Not Determined	70.0	130



QA/QC Compliance Assessment to assist with Quality Review

Work Order	: ES2514817	Page	: 1 of 10
Client	: BORAL LIMITED	Laboratory	: Environmental Division Sydney
Contact	: Ionut CiobanuOprea	Telephone	: +61-2-8784 8555
Project	: Quarterly Dunmore Sand & Soil Groundwater	Date Samples Received	: 21-May-2025
Site	: Dunmore Sand & Soil	Issue Date	: 27-May-2025
Sampler	: ----	No. of samples received	: 18
Order number	: 7002716	No. of samples analysed	: 18

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Duplicate outliers occur.
- **NO** Laboratory Control outliers occur.
- Matrix Spike outliers exist - please see following pages for full details.
- For all regular sample matrices, where applicable to the methodology, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- **NO** Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers exist - please see following pages for full details.

Page : 2 of 10
 Work Order : ES2514817
 Client : BORAL LIMITED
 Project : Quarterly Dunmore Sand & Soil Groundwater



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
ED041G: Sulfate (Turbidimetric) as SO ₄ 2- by DA	ED2500804--001	Anonymous	Sulfate as SO ₄ - Turbidimetric	14808-79-8	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
ED045G: Chloride by Discrete Analyser	ED2500804--001	Anonymous	Chloride	16887-00-6	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
EK059G: Nitrite plus Nitrate as N (NO _x) by Discrete Ar	ED2500804--002	Anonymous	Nitrite + Nitrate as N	----	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
EK067G: Total Phosphorus as P by Discrete Analyser	ES2514809--001	Anonymous	Total Phosphorus as P	----	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type		Count		Rate (%)		Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	
Matrix Spikes (MS)						
Dissolved Metals by ICP-MS - Suite A	EG020A-F	0	18	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for **VOC in soils** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation



Matrix: WATER

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED037P: Alkalinity by PC Titrator								
Clear Plastic Bottle - Natural (ED037-P)		20-May-2025	----	----	----	21-May-2025	03-Jun-2025	✔
DG17,	DG21,							
DG31S,	DG35,							
DG36,	DG1S,							
DG5S,	DG5D,							
DG6S,	DG6D,							
DG7,	GW4,							
MW5A1,	MW5A3,							
MW5B2D,	MW5B2S,							
MW5B3,	MW5B4							
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Clear Plastic Bottle - Natural (ED041G)		20-May-2025	----	----	----	22-May-2025	17-Jun-2025	✔
DG17,	DG21,							
DG31S,	DG35,							
DG36,	DG1S,							
DG5S,	DG5D,							
DG6S,	DG6D,							
DG7,	GW4,							
MW5A1,	MW5A3,							
MW5B2D,	MW5B2S,							
MW5B3,	MW5B4							
ED045G: Chloride by Discrete Analyser								
Clear Plastic Bottle - Natural (ED045G)		20-May-2025	----	----	----	22-May-2025	17-Jun-2025	✔
DG17,	DG21,							
DG31S,	DG35,							
DG36,	DG1S,							
DG5S,	DG5D,							
DG6S,	DG6D,							
DG7,	GW4,							
MW5A1,	MW5A3,							
MW5B2D,	MW5B2S,							
MW5B3,	MW5B4							

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED093T: Total Major Cations								
Clear Plastic Bottle - Natural (ED093T)		20-May-2025	23-May-2025	27-May-2025	✓	23-May-2025	27-May-2025	✓
DG17,	DG21,							
DG31S,	DG35,							
DG36,	DG1S,							
DG5S,	DG5D,							
DG6S,	DG6D,							
DG7,	GW4,							
MW5A1,	MW5A3,							
MW5B2D,	MW5B2S,							
MW5B3,	MW5B4							
EG020F: Dissolved Metals by ICP-MS								
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)		20-May-2025	----	----	----	23-May-2025	16-Nov-2025	✓
DG17,	DG21,							
DG31S,	DG35,							
DG36,	DG1S,							
DG5S,	DG5D,							
DG6S,	DG6D,							
DG7,	GW4,							
MW5A1,	MW5A3,							
MW5B2D,	MW5B2S,							
MW5B3,	MW5B4							
EK055G: Ammonia as N by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK055G)		20-May-2025	----	----	----	24-May-2025	17-Jun-2025	✓
DG17,	DG21,							
DG31S,	DG35,							
DG36,	DG1S,							
DG5S,	DG5D,							
DG6S,	DG6D,							
DG7,	GW4,							
MW5A1,	MW5A3,							
MW5B2D,	MW5B2S,							
MW5B3,	MW5B4							

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK057G: Nitrite as N by Discrete Analyser								
Clear Plastic Bottle - Natural (EK057G)		20-May-2025	----	----	----	22-May-2025	22-May-2025	✓
DG17,	DG21,							
DG31S,	DG35,							
DG36,	DG1S,							
DG5S,	DG5D,							
DG6S,	DG6D,							
DG7,	GW4,							
MW5A1,	MW5A3,							
MW5B2D,	MW5B2S,							
MW5B3,	MW5B4							
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK059G)		20-May-2025	----	----	----	24-May-2025	17-Jun-2025	✓
DG17,	DG21,							
DG31S,	DG35,							
DG36,	DG1S,							
DG5S,	DG5D,							
DG6S,	DG6D,							
DG7,	GW4,							
MW5A1,	MW5A3,							
MW5B2D,	MW5B2S,							
MW5B3,	MW5B4							
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK061G)		20-May-2025	23-May-2025	17-Jun-2025	✓	23-May-2025	17-Jun-2025	✓
DG17,	DG21,							
DG31S,	DG35,							
DG36,	DG1S,							
DG5S,	DG5D,							
DG6S,	DG6D,							
DG7,	GW4,							
MW5A1,	MW5A3,							
MW5B2D,	MW5B2S,							
MW5B3,	MW5B4							



Matrix: WATER

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK067G: Total Phosphorus as P by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK067G)		20-May-2025	23-May-2025	17-Jun-2025	✔	23-May-2025	17-Jun-2025	✔
DG17,	DG21,							
DG31S,	DG35,							
DG36,	DG1S,							
DG5S,	DG5D,							
DG6S,	DG6D,							
DG7,	GW4,							
MW5A1,	MW5A3,							
MW5B2D,	MW5B2S,							
MW5B3,	MW5B4							
MW006: Faecal Coliforms & E.coli by MF								
Sterile Plastic Bottle - Sodium Thiosulfate (MW006)		20-May-2025	----	----	----	21-May-2025	21-May-2025	✔
DG17,	DG21,							
DG31S,	DG35,							
DG36,	DG1S,							
DG5S,	DG5D,							
DG6S,	DG6D,							
DG7,	GW4,							
MW5A1,	MW5A3,							
MW5B2D,	MW5B2S,							
MW5B3,	MW5B4							
MW023: Enterococci by Membrane Filtration								
Sterile Plastic Bottle - Sodium Thiosulfate (MW023)		20-May-2025	----	----	----	21-May-2025	21-May-2025	✔
DG17,	DG21,							
DG31S,	DG35,							
DG36,	DG1S,							
DG5S,	DG5D,							
DG6S,	DG6D,							
DG7,	GW4,							
MW5A1,	MW5A3,							
MW5B2D,	MW5B2S,							
MW5B3,	MW5B4							



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Alkalinity by Auto Titrator	ED037-P	2	18	11.11	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	5	42	11.90	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	4	18	22.22	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Total	ED093T	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	6	55	10.91	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	6	50	12.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by Auto Titrator	ED037-P	2	18	11.11	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	6	42	14.29	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	18	11.11	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Total	ED093T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	3	55	5.45	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	6	50	12.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	3	20	15.00	15.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	3	42	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	18	11.11	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Total	ED093T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	3	55	5.45	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	3	50	6.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	3	42	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	0	18	0.00	5.00	✗	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard

Page : 8 of 10
 Work Order : ES2514817
 Client : BORAL LIMITED
 Project : Quarterly Dunmore Sand & Soil Groundwater



Matrix: **WATER** Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification .

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Matrix Spikes (MS) - Continued							
Nitrite as N by Discrete Analyser	EK057G	3	55	5.45	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	3	50	6.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Alkalinity by Auto Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO ₄ 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO ₄ . Dissolved sulfate is determined in a 0.45µm filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO ₄ suspension is measured by a photometer and the SO ₄ -2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G. The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocyanate forms highly-coloured ferric thiocyanate which is measured at 480 nm.
Major Cations - Total	ED093T	WATER	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Samples are digested by USEPA 3005 prior to analysis. The ICPAES technique ionises the sample atoms emitting a characteristic spectrum. This spectrum is then compared against matrix matched standards for quantification. This method is compliant with NEPM Schedule B(3)
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH ₃ G. Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Ammonium as N	EK055G-NH ₄	WATER	Ammonium in the sample is reported as the ionised / unionised fractions by the use of a nomograph and the initial pH and Temperature. Ammonia is determined by direct colorimetry by Discrete Analyser according to APHA 4500-NH ₃ G. This method is compliant with NEPM Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO ₂ - B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO ₃ - F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined separately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM Schedule B(3)
Nitrite and Nitrate as N (NO _x) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO ₃ - F. Combined oxidised Nitrogen (NO ₂ +NO ₃) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO ₃ -. This method is compliant with NEPM Schedule B(3)



<i>Analytical Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al, Zhang et al. This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM Schedule B(3)
Thermotolerant Coliforms & E.coli by Membrane Filtration	MW006	WATER	AS 4276.5
Enumeration of Enterococci by Membrane Filtration	MW023	WATER	AS4276.9
<i>Preparation Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM Schedule B(3)
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM Schedule B(3)

Mandatory Fields				CHAIN OF CUSTODY												Page ____ of ____			
CLIENT CODE: BLUCIR		*PROJECT MANAGER: Ionut Ciobanu				SAMPLER:						CoC #: (if applicable)							
*CLIENT: Boral		*PM MOBILE: 0409745832				SAMPLER MOBILE:													
OFFICE: (Invoiced Office)		ALS QUOTE # (Client PL if blank) EW24BLUCIR0001_V2				PURCHASE ORDER NO.:													
PROJECT NO./PROJECT: Quarterly Dunmore Sand & Soil Groundwater												SITE: Dunmore Sand & Soil							
*INVOICE TO: (client default if nil) sharon.makin@boral.com.au												☐ CC Invoice to PM						BIOSECURITY	
*EMAIL REPORTS TO: (default to PM if blank) sharon.makin@boral.com.au , keira.leahy@iec.com.au , ionut.ciobanu@boral.com.au , lauren.sibigroth@boral.com.au												*ANALYSIS REQUIRED (NB: ALS Quote No. and/or Analysis Suite Codes must be listed to attract suite/quoted price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required) Mark an X in the boxes below analysis to indicate the parameter listed above to be tested on that sample.							
* STORAGE REQUIREMENTS Please check box: ☒ Standard Storage ☐ Extended Storage Standard Storage time from receipt of samples: Waters - 3 weeks Soils - 2 months Specify Disposal Date: Note: Extended storage incurs a fee and requires a signed agreement.		* TURNAROUND Please check box: ☒ 5+ days (no surcharge) ☐ 3 day (+15%) ☐ 2 day (+30%) ☐ 1 day (+50%) (Not all tests can be expedited, contact Client Services for more information)		MATRIX: Soil/Solids: Water (W) Sediments (SD), Dust (D), Product (P), Biota (B), Biosolid (BS) NT-02 (Alka, SO4, Cl, F), NT-1T (Ca, K, Na, Mg) NT-08 (NH3, NO2, NO3, NoX, TKN, TN & TP) NH4, M3 Faecal Coliforms, Ecoli, Enterococci EG020A-dissolved (Fe) URGENT HT												Country of Origin: (if not Australia) WO Stic			
Comments:														Environmental Division Sydney Work Order Reference ES2514817 Telephone : + 61-2-8784 8555					
ALS Use Only	Sample ID	Depth	Date/Time	No. Bottles													Lab QC (additional bottles req.)		
Lab ID																	Dup	Mt	
1	DG17		20.05.2025/ 8:25	4													☐	☐	
2	DG21		20.05.2025/ 9:20	4													☐	☐	
3	DG31S		20.05.2025/ 9:15	4													☐	☐	
4	DG35		20.05.2025/ 9:00	4													☐	☐	
5	DG36		20.05.2025/ 8:45	4													☐	☐	
6	DG1S		20.05.2025/ 10:50	4													☐	☐	
7	DG5S		20.05.2025/ 11:10	4													☐	☐	
8	DG5D		20.05.2025/ 11:20	4													☐	☐	
9	DG6S		20.05.2025/ 11:30	4													☐	☐	
10	DG6D		20.05.2025/ 11:40	4															
11	DG7		20.05.2025/ 9:30	4															
12	GW4		20.05.2025/ 10:20	4															
13	MW5A1		20.05.2025/ 11:50	4															
14	MW5A3		20.05.2025/ 12:00	4															
15	MW5B2D		20.05.2025/ 12:10	4															
16	MW5B2S		20.05.2025/ 12:20	4															
17	MW5B3		20.05.2025/ 12:30	4															
18	MW5B4		20.05.2025/ 12:40	4													☐	☐	
Receipt Detail (Lab Use ONLY)		Chilling Method: Ice: Frozen / Melted		Ice Bricks: Frozen / Thawed		Sample Temp at Receipt: °C °C °C		Security Seal Intact (circle) Yes / No / NA(None)		Carrier Details: ☐ Courier/Post ☐ Client		Packaging: (circle) Hard Esky Foam Esky Box/Bag/Other		Count # # #					
Relinquished by: IONUT CIOBANU		Signature:		Date/Time:		Received by: Ionu		Signature:		Date/Time: 21/5/25									
Relinquished by:		Signature:		Date/Time:		Received by:		Signature:		Date/Time:									



CONTACT US

Head Office - Sydney

Shop 2, 793-799 New Canterbury Rd,
Dulwich Hill, NSW, 2203

Phone: 1300 872 230
(1300 TRACE 0)

enquiries@traceenviro.com

WWW.TRACEENVIRO.COM